



FRIDAY, FEBRUARY 10.

## Contributions.

## The Criticism of the Forth Bridge.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Mr. Lindenthal's criticisms on Messrs. Fowler & Baker's design for the Forth bridge show how much easier it is to criticise than to design.

For example, he shows at the central pier two arches with no means of resisting the horizontal components of their thrust, or, in other words, "butting against nothing." I am afraid Mr. Baker will hardly cross the Atlantic to "seek counsel" of American engineers, if their suggestions be like this.

It is proper, however, to say that some of Mr. Lindenthal's criticisms are sound, and represent the opinions of competent bridge engineers in this country.

For example, the steel tubes, 360 ft. high and 12 ft. diameter, are decidedly open to the objections given by Mr. Lindenthal.

Also the marked lines of the Fowler & Baker design are objectionable, and the arched top chords of the central span.

Even with steel plates and angles at three cents per pound, it seems incredible that this bridge can be built for \$1,000,000.

However, if any men in England can do it, Messrs. Fowler & Baker can; and the words of Mr. Lindenthal will be indorsed by every one, "that the good will and wishes of all in their profession will be with them."

FEB. 3, 1892.

T. C. CLARKE,

Member American Society of Civil Engineers.

## Accidents from Spreading of Rails—Saving Cinders.

TO THE EDITOR OF THE RAILROAD GAZETTE:

We frequently hear of derailments caused by the rails spreading, and in almost every instance the results are serious. There are such things as unavoidable accidents, but those from spreading of rails are not of that class, and any road that allows anything of the kind to occur on its line may be deemed guilty of gross carelessness. To say that the ties were decayed or that there were not spikes enough is no excuse. Nor does it suffice to say that the company is poor and cannot afford to provide ties and spikes. It often happens that these poor companies put on airs with their stylish equipment, which they manage somehow to procure, and there is no doubt but their patrons would prefer to ride in a plain coach on a substantial track rather than in a gilded palace car over rotten ties. There never has been, nor ever will be, a railroad successfully managed unless the permanent way received the first consideration. Officers of new roads are liable to mistake *style* for *business*, and they will squander some thousands of dollars in decoration which should properly be expended for something substantial. They forget that the wealthiest roads in the country have become so by studying economy and by looking out for safety first and luxury and elegance afterward. When it is proposed to purchase an article of luxury or ornament it is better to pause and inquire whether it would bring any business to the road and whether that business would purchase more ties and spikes than the money paid for the *style*. A thousand dollars worth of ties and spikes is better than fifty thousand dollars invested in ditched trains, broken limbs and corpses. The Pennsylvania Railroad engineers long ago recognized the importance of thorough rail fastening, and if their system was adopted by other roads it would save money to the companies and life and limb to the public.

When the Pennsylvania road places a rail in the track they expect it to stay there, and to this end they not only use spikes freely but they also use rail braces at all points where they are needed. On sharp curves they are placed on every tie on the outside of both inner and outer rails, and they are also used on tangents if there is the least suspicion that the fastenings would be insecure without them. On easy curves they are only placed on every alternate tie, and on easier curves on every third tie. In yards they are used freely and the gauge of the track is thoroughly preserved. Some of the braces are held with two spikes, others with three and some with four, according to circumstances.

When a rail is held by spikes alone, the constant vibration gradually loosens the spikes and the rail pulls them out. When a tie is firmly embedded in ballast, the rail, after being depressed by passing trains, on springing back to its normal position lifts on the spike heads until finally the spike becomes loose and pulls out. Miles and miles of track may be found with the spikes an inch or more out of the tie, and men are frequently sent over the track to drive down the loose spikes. But where rail braces are used the tie follows the vibration of the rail, by reason of its being so firmly attached. The rail braces never release their hold, and the rail and tie are held in close contact and there is no displacement of rail or loosening of spikes. Putting in extra spikes may serve as a temporary relief, but they soon work loose or yield in the tinner, and they are not reliable unless they are driven through the cast rail braces. If the cast ones cannot be had, it is better to use hard wood blocks well fitted and firmly spiked. This is a matter that all track-men should look after.

Another thing worthy the attention of yard men is the removal of ashes and cinders that are removed from locomotive fire-boxes. The practice of cleaning fire-boxes here and there, all over the yard, is a slovenly one, and it creates a great nuisance. Piles of cinders about the yard present an unsightly appearance, besides being in the way of all kinds of yard work. The Pennsylvania Railroad has a pit at the entrance to the round-house, where all fire-boxes are cleaned before the engine goes into the house. This pit is bricked up and plastered smooth, so that cinders can easily be shoveled out when the pit needs emptying, which is once every 12 hours. An incline is made from the pit to a platform near by, where box cars are loaded with these cinders by wheel-barrows from the pit.

Two cars are loaded here every 24 hours. These are hauled out to some place where ballast is needed to patch up the surface, and thus what would otherwise be a nuisance is utilized and made profitable. It is customary on many roads to have a back track or some by-place where fire-boxes are cleaned out, or they go about the yard "committing a nuisance" just where it happens. This is not only untidy but wasteful, and the plan of the Pennsylvania road may be followed by other roads to a good advantage, especially *poor roads* that are short of ballast, ties and spikes and *good management*.

WM. S. HUNTINGTON.

## Automatic Brakes.

WINDSOR HOTEL, JERSEY CITY, Feb. 6, 1892.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I was glad to see the communication from the Eames Vacuum Brake Co. in your issue of Jan. 27, and hope it will be but the beginning of a valuable discussion on the subject of continuous brakes.

It occurred to me some time ago that a brake could be made that would do all or more than the Westinghouse automatic brake does, and at the same time avoid its complicated and delicate machinery—in fact, be nearly as simple and cheap as the simplest continuous brake in use.

To do this I would reverse the principle of all the continuous brakes now in use, and have a weight under each car placed on the end of a lever, which weight, acting through the lever and rods, would be a *constant, active power tending to apply the brakes* to its own car, and I would use the *power derived from the vacuum* formed on the locomotive to *raise those weights*, and thereby take off the brakes and keep them off while the train is in motion.

In this way every requirement of a continuous brake would be fulfilled more perfectly and by more simple mechanism than by any other brake I know of.

It would be more *certain of action*, inasmuch as you can always be more certain of *destroying a vacuum* than making one.

It would be more *instantaneous* in its action than most, because a vacuum is more quickly destroyed than made.

Your brakes are known to be in order if you are able to start your train.

The brakes can be applied from any car by opening a valve, thereby destroying the vacuum in the pipes.

The action of the common hand brake is not interfered with—only reversed.

If the train breaks in two, the brakes are automatically applied.

The vacuum would have to be maintained while the train was in motion, which would make it a little more expensive to operate than some.

For simplicity's sake I have, in the description, used a weight on a lever as the power to apply the brakes, and a vacuum to keep them off. Instead of a weight, a spring might be used, and instead of a vacuum, compressed air or hydraulic pressure.

I am aware this idea is not altogether new, but think the principle the correct one.

C. D. WARD.

## Notes on Cars—Seats, Upholstery and Painting.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The seats and their appurtenances, including the labor of the upholsterer seem to be a steadily increasing item of cost in the best cars. It has not yet risen to one-fifth the total cost of the finished car, but it threatens so to do. It has already reached about 17 per cent. on some cars.

As an offset to this, however, there remains the fact that a good seat will last a long wear without any additional cost for new materials. Good plush will last from 10 to 15 years, and with an additional 20 lbs. of hair per car whenever it is reupholstered, the hair and other materials will last an indefinitely long time. Reupholstering will not be required oftener than once in five years, if so often; so that, besides a little varnish once in a great interval on the seat castings, and an occasional accident to these, running expenses for seats see: to reduce themselves to the care of the plush. Plush seats not only need dusting, but that peculiar mixture of grease and carbon and all sorts of odds and ends (including sometimes interesting specimens of vermin) need attention as often as the passengers refuse any more to sit on such seats. To clean off this black mixture some upholsterers use common soap and a bunch of hair, but Mr. Small, of the Boston & Albany shops, uses a preparation which at least does the work most effectively, and without the necessity of removing the plush. He has been able, since its introduction, to reuse discarded plush which had been thrown aside as too filthy for any self-respecting road; the color of the cleaned material approaching the original in brightness, although necessarily revealing the full extent of its loss of fibres by wear.

The Boston & Albany is also replacing the metallic band

(the seat-back band) by a band of leather put on with leather-headed nails manufactured specially for this use.

## THE PROBLEM OF A SEAT-COVERING.

As seats are now upholstered, there can be no question of the pre-eminent advantage of plush as seat-covering. Notwithstanding the dust, the grease and the vermin, the easy sitting surface of the material, together with its long life, make it, in the minds of nearly all who have to do with the subject, the only material fit for the purpose.

Still the grease and dirt and a sort of shoddy aspect in a car upholstered in red plush seem to keep car upholstery in an experimental stage.

Leather is being tried on a number of roads, the Boston & Albany, the Eastern, and still others. Its first cost is about the same as plush, and while there is little definite experience to be had, it is admitted that it will probably wear as long. Its principal defects are supposed to be the harder and more slippery qualities of its surface, and the wearing off of its artificial color, which rests only on the surface. The first of these difficulties, however, is a matter of upholstery—no one complains of a properly upholstered leather-covered chair. The Boston & Albany leather seats are, I believe, bottomed, as all leather seats should be, and I do not believe there would be much complaint in their case on any but long journeys, nor am I sure there would be at any time. No cars need to be at once so clean and so free from all tendency to soil as through cars, in which every variety of posture is assumed by the traveler in the long hours of his confinement in them.

As to the wearing off of the color, it would not be an impossible thing to recolor the leather, even in place. If the other defects were remedied by proper upholstery, this would be the only one remaining, for a leather-covered seat takes in little or no dust, it can be kept entirely clean, and a car furnished with it is in much better taste than one furnished with plush-covered seats.

## SEATS BY THE SEASON.

The Eastern road made quite a hit in a drawing-room car which was built at its shops. It offered its chairs for sale by the season for the price of an additional commutation ticket to whatever point the commuter rode; getting back in this way one-fifth the cost of the car in three months. Probably, however, its unique summer travel makes this an experiment which could be repeated but in few other spots.

## THE COLOR OF CARS.

Probably the majority of painters are opposed to the change which is now going on from the light to the dark colors as tints for the outside of cars. Their argument is the simple one, that the darker colors absorb more heat, and therefore more quickly destroy the varnish.

Painting cars is so large a part of their running expenses, as we shall show at another time, that this is a serious objection if true; painting and varnishing, considered as a matter of expense, approach in importance the question of a more or less lasting car wheel.

The darker, or Pullman, color has the advantage of failing to show how dirty it is; but this is also disadvantageous to the degree in which the presence of the soot and cinders tends to injure the paint.

As a contribution to this controversy, the Master Car-Painter of the Wason Manufacturing Company, at Springfield, undertook the following experiment:

A prepared set of panels (the back being painted) was divided into five sections. Four of the sections were then primed with oil and white lead, followed by two coats of lead, rough-stuff, and the color coat, one-half of each panel being in orange, the other half in the Pullman color. On each of these four panels there was then used a different make of varnish. The fifth panel was painted with Murphy's "A B C system," which consists of a wood-filling instead of a priming coat, etc.

The panel was then exposed to the elements for fourteen months.

Let me say here, however, that the results of such tests can be manufactured to order. They are of little value unless done by an honest man having no interests to serve. I will further say, therefore, that this individual test has my full confidence.

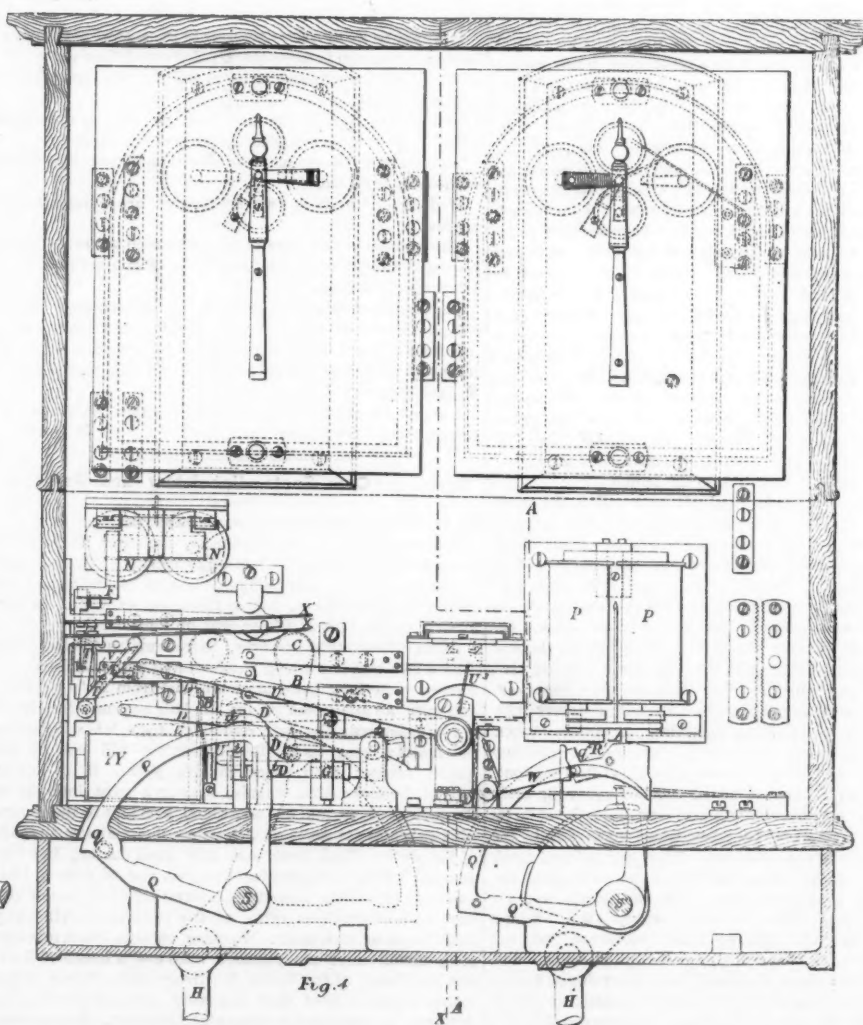
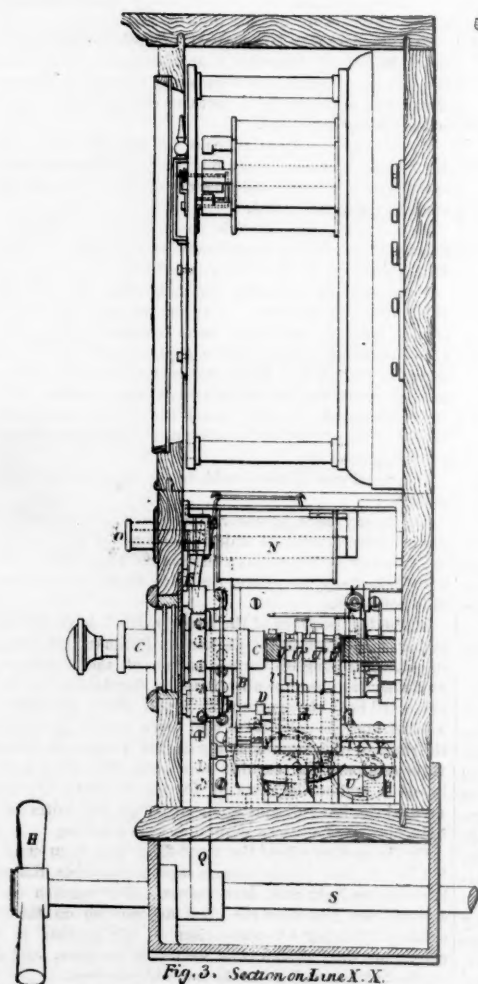
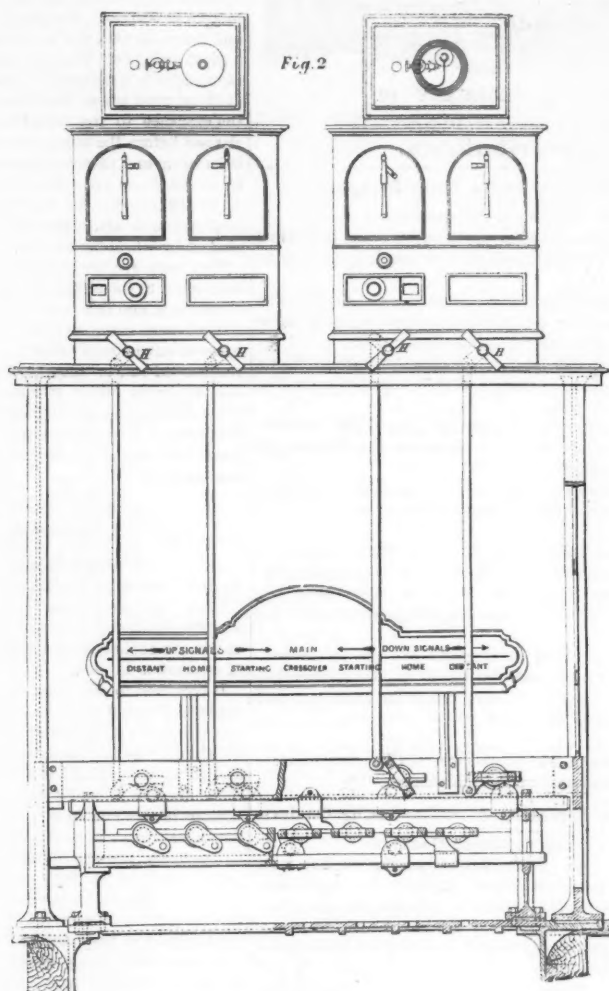
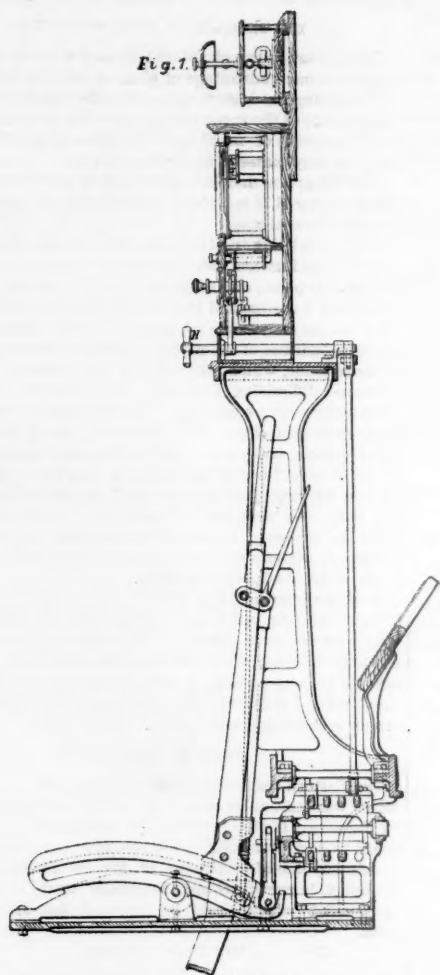
Of the four sections of the panel which I have classed together, no portion in the darker or Pullman tint remained intact. The English varnish on one of these sections was evidently far ahead of all others in durability, but it had protected only the centre of its panel; above and below, the varnish and the color were well worn away. It was about the same or still more with the darker portion of the other three sections; the varnish was gone, the color had followed it, and on the butts of the panels about everything seemed to have disappeared, although the butts of the light portion of sections showed no such scouring.

On the section where the wood-filler had been used (the "A B C system") there was no such perceptible difference between the light and dark colors. The varnish on this section had not stood the test as well as on the other sections (judging by comparison of the portion in light color), but the Pullman color seemed to be there, and there on the butts as well as on the smoother surface.

It must be said, however, that its removal would have been less perceptible, because the undercoats of this section were also dark.

I think, however, any open mind would be convinced by this panel of the following facts, to the extent to which one experiment should give conviction:

1. The Pullman color does not retain its varnish so well, and disappears when the varnish has been lost; this loss



## ELECTRIC BLOCK AND INTERLOCKING SIGNALS.

Constructed by Messrs. Saxby &amp; Farmer, Engineers, London.



being, probably, by the effects of the greater amount of heat absorbed by the color.

2. That there is no varnish now made in this country which is so durable as good English varnish. American varnishes have other qualities than durability in which they are superior to English varnishes; specially is this the case in regard to ease of working.

3. That a filler, whether by absorption of heat from its greater body (the wood itself being a poor heat conductor) or otherwise, does protect the varnish placed over a dark surface.

I state these conclusions the more boldly because I have

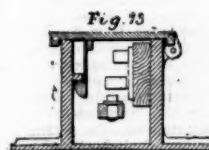
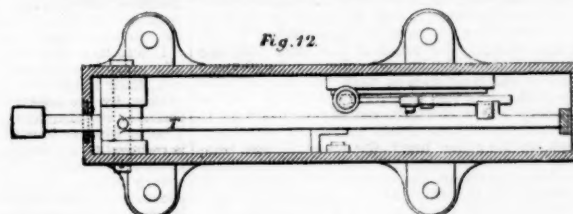
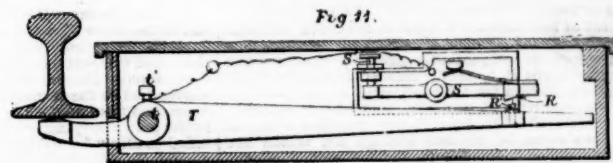
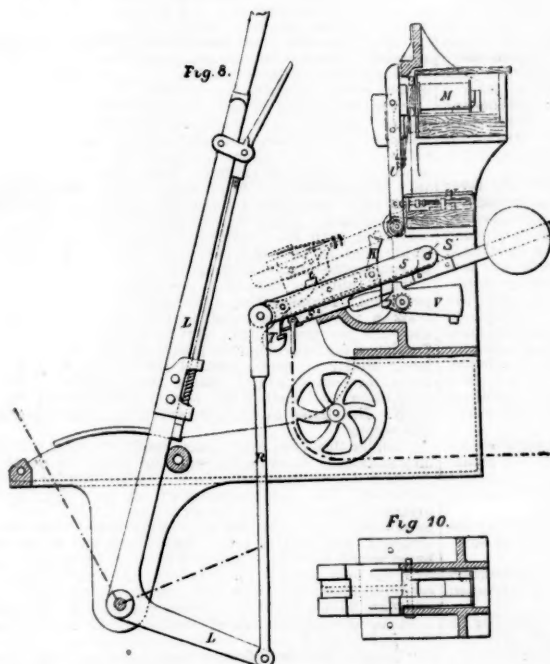
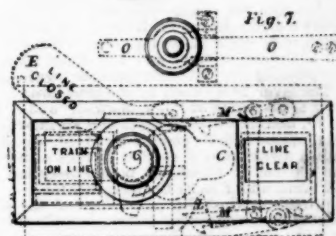
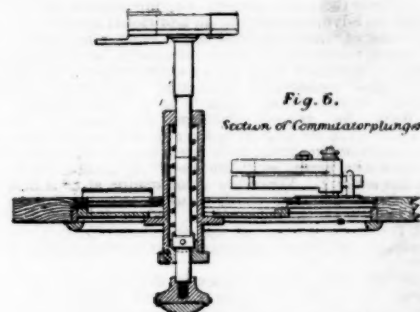
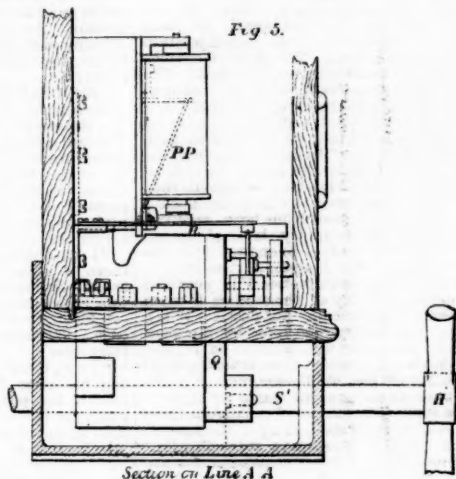
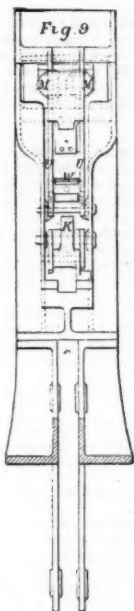
point and signal levers and the block telegraph instruments, and the working of the block system is rendered absolute. Messrs. Saxby and Farmer also exhibited at Paris another important railway safety appliance, namely, the electric slot, which is the invention of Mr. Farmer, a member of the firm, and Mr. Tyer. We give full drawings and description of this appliance also.

In our illustrations figs. 1 and 2 show the general arrangement of the machinery for the union of the lock and block, and figs. 3 to 7, and 11 to 13, show the details of the different appliances, figs. 8, 9, and 10 show the electric slot.

On reference to figs. 1 and 2, it will be seen that the exhibit consisted of a point and signal interlocking apparatus containing seven levers, constructed on the most approved

again to "line clear" until the expected train has arrived and passed out of the section, when the commutator again becomes free to be moved.

*C* and *C'* (fig. 4) indicate the commutator plunger in its two positions—position *C* for sending "line blocked," position *C'* for sending "line clear." The locking handles *H* and *H'* are attached to horizontal shafts *SS'*, to which are also attached quadrants *Q* and *Q'*. The hook lock *L* (fig. 7) rests upon the top of the quadrant *Q*, and in that position is engaged with a projection on the barrel of the commutator plunger. When the locking handle *H* is turned from left to right the quadrant *Q* is also turned, and the flattened part *q*, coming under the locking-hook *L*, allows the latter to drop and releases the commutator. When the commutator is moved from right to left, a projection *B*



## ELECTRIC BLOCK AND INTERLOCKING SIGNALS

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more reason to believe them true from other trials and evidence, the first two especially.

On the other hand, the dark (or Pullman) color on cars in service does not show this tendency to wear away nearly so plainly. The panel was placed, I believe, in a sunny spot, and, therefore, the effects would be very considerably exaggerated.

X. Y. Z.

### Block and Interlocking Signals.

Everything relating to or which gives reliable information concerning the working of the block or interlocking system of signals is now of interest to railroad men. The following is a description of the apparatus which was exhibited at the late electrical exhibition in Paris by Messrs. Saxby & Farmer and which is the invention of Mr. Charles Hodgson, their Chief Engineer. The description and engravings are taken from *Engineering*:

The two important systems which enter so largely into railway working, and contribute so much to safety, are, as is well known, the interlocking of points and signals, and the telegraphic block system—the former secures the harmonious working of points and signals, and the latter is intended to secure a proper interval of space between trains. Up to the year 1877 these two systems had been worked independent the one of the other, that is so far as any physical connection between the two sets of apparatus went, and the result of this independence is the cause of frequent accidents in consequence of frequent mistakes being made by signalmen. By the inventions we are now about to describe, however, a perfect interdependence is established between the

principle, with preliminary action of locking gear, and two sets of electric block telegraph instruments (mounted on suitable supports above the point and signal levers) for working the block system for up and down lines on either side.

Each block instrument is provided with locking handles *H* *H'*, which by means of the shafts *SS'*, rods, etc., are made to interlock with the point and signal levers in such a manner that they cannot be manipulated contradictorily. The block instruments are also provided with spring plunger commutators capable of being moved into two positions. When on the right-hand side, on being pressed, the message "line blocked" is sent, and when on the left-hand side, "line clear" is sent. These sliding commutators are interlocked with the locking handles, so that the handles must be turned from left to right before the commutator can be moved from right to left. By this means the point and signal levers must first be placed in proper position before the locking handles can be turned and the locking handle must be turned before the commutator can be moved to the "line clear" position. When the point and signal levers are set right, and the locking handle has been turned, the levers become locked, and remain locked until the locking handle has been restored to its original position; and when the commutator (having been released by the turning of the locking handle) has been moved to the left for the purpose of sending "line clear," the locking handle becomes locked and cannot be moved back to its original position until the commutator has been placed at "line blocked," and pressed in there; neither can the handle be moved until the expected train has passed out of the section, in doing which it passes over a treadle hereafter described, and releases the handle of the commutator. The commutator, in being moved from right to left, and back again, acts upon the locking mechanism in such a manner that it (the commutator) gets locked in the "line blocked" position, and cannot be moved

comes in contact with a protuberance on a bent lever *D* (fig. 4), pushing it down from the dotted position so as to hook hold of a stud, *D'*, fixed in the quadrant *Q*, locking the locking handle. The commutator, also, in passing from right to left, lifts up a plate *E* (fig. 7), which has a projection at one end supporting the locking hooks *M* *M'*. When the plate *E* is lifted up these locking hooks fall, and *M'* engages with the stud upon the quadrant *Q*, locking it in its reversed position. The plate *E* is provided with a stud, which becomes engaged with the hooked armature *F*, pivoted in front of the pair of electric magnets *NN*. When the commutator is moved back to position *C* the plate *E* remains hooked up, the commutator lifts the hooked lock *M*, which, falling again, locks the commutator so that it cannot be moved to the left or *C'* position. As soon as the train arrives and passes over a certain point on the line, where the treadle hereafter described is fixed, a current of electricity is sent through electro-magnets *NN*, thereby attracting the armature *F*, and so releasing the plate *E*, which falls, and lifts the locking hooks *M* *M'*, releasing the commutator and the quadrant *Q*. But if, by an oversight, the commutator, although moved to position *C*, has not been pressed in for the purpose of sending "line blocked," the quadrant *Q* still remains locked by the hook on the bent lever *D*. In pressing in the commutator at position *C*, a crank *G* is moved, and the bent lever *D* is raised to the dotted position, releasing the quadrant *Q*. In case of any derangement taking place in the wires or batteries, of course no current of electricity would be sent through the electro-magnets *NN*, consequently the plate *E* would remain hooked up in *F*, and the commutator would be locked at "line blocked." In order, under such circumstances, to release the instrument, a special releaser *O* is provided, the key of which is kept by the station master or other responsible officer, and only used in cases of emergency, the signalman having no power whatever to alter the



apparatus. On the second shaft  $S^2$  is fixed another quadrant  $Q^2$ , having a notch in its edge  $q^2$ . Over this quadrant is suspended a lever  $R$ , attached to the armature of the electro-magnets  $P^2$ . When a current of electricity passes through the coils of the electro-magnets  $P^2$ , which occurs when the message "line clear" is received from the next station, the armature is held against the magnets, the lever  $R$  does not fall, and the quadrant  $Q^2$  can be turned from left to right, the notch  $q^2$  passing by the lever  $R$ , but when "line blocked" is received the armature, and with it the lever  $R$ , being no longer held up by the magnets  $P^2$ , falls into the notch  $q^2$ , and so the turning of the quadrant  $Q^2$ , and with it the locking handle  $H^2$ , is arrested. The locking handle  $H^2$  must be turned before the lever which works the starting signal can be moved, and consequently when "line blocked" is received, the quadrant  $Q^2$  being locked, the handle  $H^2$  cannot be turned, and the starting signal cannot be moved. By this means the starting signal is controlled from the next station. In cases where there are several starting signals, all released from the advanced station, an additional appliance is used, by means of which only one signal can be lowered at a time, it being necessary to obtain permission by means of the message "line clear" each time a signal is used. In the event of the signalman neglecting to move the commutator from "line clear" to "line blocked" (which duty he should perform as soon as he receives notice from the station in the rear that a train is in the section approaching him), he is prevented from pressing in the commutator again at "line clear" by means of the falling of the lever  $T$ . When the commutator at  $C$  is first pressed in, it acts upon the shaft crank  $t$ , so as to lift the long lever  $U$  from the dotted position. When  $U$  is raised as described, it rests on the top of the armature  $U^1$ , and the further pressing in of the commutator has no effect upon it whatever.

When the signalman at the station in the rear announces the departure of a train (which he is obliged to do before he can lower his out-door starting signal) a current of electricity is sent through the electro-magnets  $Y^1$ , attracting the armature  $M^1$  which releases the lever  $U$ , which falls and allows  $T^1$ , which rests upon it, to fall also, bringing  $T$  between the end of the commutator and the fixed stud, so as to prevent the pushing-in of the commutator again at the position  $C$ . The lever  $T$  is raised by the bent lever  $D$  when the commutator is pressed in at "line blocked," and  $T$ , which is attached to  $T^1$ , becomes hooked up in the spring-catch  $V$ . When the commutator is first pushed in at  $C$ , the spring-catch  $V$  is pushed away from  $T$ , so that  $T$  falls a little way and rests upon the end of  $U$ , and as before described when  $U$  is released  $T$  falls and locks the commutator.

In order to provide against the possibility of the signalman at the next station neglecting to properly block behind the train sent on to him, the pair of contact springs  $X^1$  are provided. The commutator in passing from right to left acts upon the projection on  $X$  so as to close the springs and send a transitory current through the coils of the electro-magnets  $P^1$  (contained in the other set of instruments), and acted upon from the next station in advance, so releasing the lever  $R$  and locking the quadrant  $Q^1$ . This quadrant  $Q^1$  in the other set of instruments is made to interlock with the commutator  $C$ , so that it (the quadrant) must be in its normal position before the commutator can be moved to "line clear." By this means it is made impossible to send "line clear" to the rear station for a second train to advance, unless the instrument worked from the next station has been put at "line blocked." The lever  $U$  has attached to one of its extremities a series of contact springs  $U^2$ , which are interposed between contact points  $Z^1$ , connected respectively to the line wire, to earth, and to the opposite poles of the battery. Thus, when lever  $U$  is in its raised position as shown in fig. 4, to which position it had been raised by the pushing in of the plunger, the contacts are such that the currents transmitted along the line wire by the turning of the handle  $H$  are of the same sign as that which had been transmitted by pushing in the plunger, consequently those currents do not interfere with others already sent so as to undo the action which had been produced by the use of the plunger. When, on the other hand, the lever  $U$  has been released by the movement of the armature  $U^1$  and has dropped to the dotted position, the contacts  $Z^1$  are altered so that when the handle  $H$  is turned for announcing the departure of a train, currents are transmitted of opposite sign, that is to say, of the same sign as the current transmitted by pushing in the commutator. In the event of its being necessary to send "line blocked" before the message "line clear" sent to the rear station has been accepted and acted upon the lever  $U$  is lowered by the action of the commutator in position  $C$ . Thus upon the bent lever  $D$  is fixed a stud  $d$  which when  $D$  is raised into the dotted position acts upon a protuberance  $U^3$  formed upon the armature  $U^1$ , removing the support from under the lever  $U$ , which falls into the dotted position, changing the contacts again. Thus the action resulting from pushing in the commutator is not interfered with by the use of other instruments acting through the same line wire, and not only so but if after his message "line clear" has been accepted the attendant should have omitted to push in the plunger at  $C$  the same effect will be produced by the use of the other instrument  $H^1$  as if he had made no such omission. The shaft  $S^1$  carrying the quadrant  $Q^1$  is provided with an arrangement, as shown, for making contact with the line wire to send a message to the next station, and it is also provided with an additional make-and-break arrangement, so that in turning the quadrant  $Q^1$  from left to right a current is sent, but in restoring the quadrant to its original position by turning it from right to left no current whatever is sent; the lever  $W$ , acted upon by studs in the quadrant  $Q^1$ , is for this purpose.

Figs. 8 and 9 are views of the electric slot apparatus, so called because it has the same objects and obtains the same advantages as are obtained by the mechanical slot, with this difference, that whereas mechanical means of working by rods or wires are necessarily limited to the distance at which those means are available the electric means of working are altogether irrespective of distance.

The advantages derived from the use of the electric slot are that one and the same out-door signal can be worked and controlled by two or more signalmen stationed at places apart from each other. Each signalman has the power of placing and holding the signal at "danger" independently of any action on the part of either of the other signalmen, and consequently it is impossible that the signal can be placed in the attitude indicating safety without the consent and concurrent action of each and all of the signalmen concerned in the working of it. The electric slot is the only contrivance by which an out-door signal at one station can be instantaneously changed from the safety to the danger attitude from any other station irrespective of distance. This power of direct and instantaneous action upon the out-door signals at a distant station may under circumstances of emergency be of supreme importance in preventing accidents or mitigating their consequences.

In figs. 8, 9 and 10,  $L$  is a lever which works the out-door semaphore starting signal used for giving permission to a train to go forward into the next section of the line. The end of this lever  $L$  is connected by the rod  $R$  to a lever  $S$  pivoted at  $S^1$  on the main framing of the machine. Upon

the lever  $S$  is mounted a catch or hook  $T$ , which under certain conditions engages with the second lever  $S^2$  pivoted on the same centre as the lever  $S$ ; the lever  $S^2$  is connected to the semaphore signal with chains, wheels, and wires in the usual way. When the signal lever  $L$  is pulled over the catch or hook  $T$  engaging with the end of the lever  $S^2$  lifts it up and thereby pulls the signal off. Above the lever  $S$  is fixed a weighted lever  $U$ . This is shown upon the drawing in a vertical position, being kept in that position by the electro-magnets  $M$ . In this state of things the signal can be worked by the lever  $L$  in the usual way. "Line clear" having been received the magnets  $M$  are excited, and keep the armature which is attached to the weighted lever  $U$  attracted, and so prevent the weighted lever  $U$  from falling. As soon as the message "line blocked" is received on the telegraph instrument the magnets  $M$  cease to attract the armature attached to the weighted lever  $U$ , which latter falls upon the end of the hook  $T$ , thereby disengaging it from the end of the lever  $S^2$ . Thus, although the lever  $L$  is pulled over for the purpose of keeping the signal off, the falling of the weighted lever  $U$  disconnects the connexion and instantaneously places the signal at "danger." As long as the weighted lever  $U$  remains down in the dotted position it is impossible to lower the signal. The lever  $L$  may be moved, but it has no effect whatever upon the signal. The weighted lever  $U$  is raised to a vertical position by means of the crutch  $K$ , which is attached to the lever  $S$ , so that when the lever  $L$  is pulled over and  $S$  raised, the crutch  $K$ , acting under the stud attached to  $U$ , raises it to the vertical position, and if the message "line clear" has been received, the electro-magnets attract the armature and keep  $U$  in a vertical position; but if "line blocked" has been received, then the weighted lever  $U$  falls down again to keep the hook  $T$  disengaged from  $S^2$ . When "line clear" has been received and  $U$ , consequently, remains held up, the lever  $L$  is put home again, so as to allow the hook  $T$  to engage with the end of  $S^2$ , and then on pulling over  $L$  again  $S^2$  rises with  $S$ , and the signal is lowered. The contrivance  $V$  is provided to cant the crutch  $K$  out of the way of the stud on  $U$  when the weight is falling and when  $S$  is being put down.  $W$  is a plunger contact-making apparatus acted upon by the lever  $U$ . When  $U$  is raised it presses in the plunger of  $W$ , and contact is made, and the electric current flows from the local battery through the coils of the electro-magnets  $M$ . The object of this contrivance is to prevent waste of battery power. As long as the lever  $U$  is not raised no current flows through  $M$ , but as soon as  $U$  is pushed in by  $U$  the current flows through  $M$  and holds  $U$  up, always supposing that "line clear" has been received. When the instruments are at "line blocked" the local battery is inoperative, and the pressing in of  $W$  has no effect whatever.

Figs. 11, 12 and 13 show the arrangement of treadle adopted for enabling the passage of a train over the railway to send a current through the electro-magnets  $N$  of the block telegraph instruments, for the purpose of releasing the plate  $E$  and allowing it to fall to unlock the sliding commutator. The action of the treadle will, we think, be readily understood from the illustration. When the train passes along the line the rail is deflected and presses down the short end of the lever  $T$ , which is pivoted in the cast-iron box at  $t$ ; as the short end descends the long end of the lever  $T$  rises, and the contact-piece  $R$  comes against a corresponding contact-piece  $R^1$ , and the circuit is completed. One line wire is attached to the terminal screw  $T^2$ , fixed in the boss of the lever, and the other wire is attached to the terminal screw in the plate carrying the short lever  $S$ . The lever  $S$  is provided to allow for variations in the movement of the lever  $T$ , and the adjusting set pins  $S^1$  are used for adjusting the distance between the contact-points  $R$  and  $R^1$ . The lever  $S$ , with its foundation plate, etc., is fixed on to a block of wood attached to the cast-iron box which carries the treadle lever  $T$ . It will be seen that by this arrangement the difficulty usually experienced with treadles acted upon by passing trains, viz., their liability to get out of order, or be destroyed altogether, by the repeated blows received from the wheels of trains in rapid motion, is satisfactorily got rid of. The lever  $T$  being always in contact with the rail, the wear and tear is reduced to a minimum, and in consequence of the relative proportions between the short and the long end of the lever a very slight deflection of the rail gives quite sufficient amount of movement to the long end of the lever for insuring satisfactory contact.

These treadles are found to act in a thoroughly satisfactory manner, and to require the very smallest amount of attention. All that is necessary is to see that they are properly adjusted whenever the permanent way is repaired or in any manner disturbed.

The use of the before-described inventions in working the block system comprehend advantages which may be summarized in the following manner:

1. Points and out-door signals must be in proper position before "line clear" can be telegraphed for an expected train.
2. No movement of points can be made for shunting or giving access to a line signalled by telegraph as clear for an expected train, the points remaining firmly locked until the train has passed out of the block section.
3. Having once sent "line clear" on the telegraphic block instrument, and the permission to send a train on having been accepted and acted upon by the signalman at the next station, it is impossible to transmit a second message of "line clear" until the expected train has passed, thus two trains running on the same line of rails cannot be signalled to enter the same section at once; the first train must have left the section before the second one can be permitted to enter.
4. The out-door starting signal cannot be given to permit entrance into a block section without the consent and concurrent action of the signalmen at both ends of such block section; and by means of the electric slot the out-door signal at one station can be instantaneously changed from the "safety" to the "danger" attitude from any other station, irrespective of distance.
5. The mechanism makes it compulsory that the out-door starting signal shall be reset to "danger" behind every train; and that upon the entrance of a train into a block section, the signalman at the station in advance shall give to the signalman at the station in rear the proper signal of "line blocked" behind the coming train.
6. The signal "train on line" must be transmitted to the station in advance before the out door signal for a train to enter a block section unannounced by telegraph to the station in advance.

The instruments which were exhibited at Paris were constructed to work on the one-wire system, one line-wire only being required for the transmission of the block telegraph signals and for the ringing of bells for traffic on both up and down lines of railway, by which means the first cost of installing the appliance is reduced to the utmost possible extent; but at the same time the arrangements may be varied to suit any type of telegraph instruments or interlocking apparatus, or to suit any other mode of block working or method of generating the electric power.

The system has been satisfactorily at work for some time on some of the Southern lines in England, and is being still further introduced, and it has been very extensively adopted in Belgium. Whenever it has been used it has been found

to answer its purpose thoroughly and to give great satisfaction, and there is no doubt that had it been in use at Charenton, on the Paris, Lyons & Mediterranean Railway, the recent lamentable accident resulting in such serious loss of life would have been rendered impossible, while it would also have undoubtedly prevented the disastrous collisions in the Canbury Tunnel. It has received the unqualified approval of the inspecting officers of the Board of Trade. The system, as applied on a portion of the new Tunbridge Wells & Eastbourne line of the London, Brighton & South Coast Railway, has also lately been made the subject of a highly favorable report by Colonel Yolland.

#### Authority to Take Property for the Construction of Railroads.

[From the Thirteenth Annual Report of the Massachusetts Railroad Commissioners.]

The Board has seen no reason for changing its views as to the necessity for some tribunal to pass upon the question of exigency, before permitting land or other property to be taken from an unwilling owner under the right of eminent domain. As a convenient way of stating these views, the opening and closing remarks of the Chairman, at a hearing before the legislative committee on railroads, are here given:

"Mr. CHAIRMAN.—The views of the Board are set forth in their report. I only propose to give them a little more fully. The statement of the law, as it exists, is the best argument. The law now is, that, if any man wishes to construct a steam railroad through the heart of the city of Boston, he has a right to do so, although the city authorities are unanimous in opposing it, although every citizen of Boston opposes it, and although the Commissioners, who grant the route, believe that it is needless, and that it will produce vast injury and no good.

"I say one man can do this. There is a vague idea that there is some virtue in the provision of the law requiring twenty-five associates. But the one man with capital may join with him twenty-four others—his workmen, his clerks—taking care that they have the money to pay for one share each. This is no imaginary case, and under law it was rightfully done.

"Now, it has always been the law that no man's property can be taken from him without his consent, unless it is needed for public use. And this is the rule, not in free countries only, but in all countries governed by law. It has been an acknowledged principle ever since the great case, 'the leading case,' of *Naboth's vineyard*.

"If property cannot be taken unless it is needed for public use, it follows that some tribunal must decide the question of need. Formerly that tribunal was the Legislature. Now the parties interested in the road are constituted as a tribunal for deciding the question. The party is made sole judge, and judge in his own cause. But Blackstone says that even the omnipotence of Parliament cannot make a man judge in his own cause, and that such an act, if passed, would be void as against common right.

"But it is said that the cost of building a railroad is an unfeeling security that no unnecessary road will be built. No road will be constructed unless it is profitable, and no road can be profitable unless it is needed.

"This reasoning is simply contrary to all railroad experience. England and the United States furnish too many instances of needless, unprofitable and bankrupt railroads. Of seventy railroad corporations in New York, seventeen only paid dividends last year. Of sixty-two in Massachusetts, thirty-two paid dividends; but some only paid one or two per cent. Of the railroads in this country, probably one-half are insolvent. And yet we are to take the prudence of investors as an infallible guide, and as complete assurance that railroads will never be constructed unless they are needed.

"It is said that this is a theoretical objection, and not practical. I confess that I do dislike to see upon our statute book a provision subversive of sound principle, even if it does no practical harm. But I do not rely upon this old-fashioned notion. There is practical mischief in our present law. Under it, three parallel routes have been demanded upon Nantasket Beach, where three roads would destroy each other, and destroy the beauty and value of the beach itself. No virtue in the law saved us from this absurdity and wrong.

"Under this law, four steam roads, running through the city of Boston from end to end and from side to side were demanded, and must have been granted but for a technical objection. The bombardment of our city would not have injured it more than the construction of these roads would have done. It is said that they never would have been constructed; and this is true. But it does not follow that no harm would have been done. The cloud hanging for a year over the vast amount of property condemned would have rendered impossible either sales or improvements. And in addition to the sense of insecurity affecting all property-holders, the actual loss of value would have been immense.

"There is practical danger that railroads will be asked for, and laid out—not to be built, but to be bought off. With the revival of business, speculation—dishonest speculation—will revive. If the law remains, we shall have blackmail routes. And, at all events, it seems unwise to enact wrong into law, and to trust to somebody's ingenuity, and to everybody's forbearance, and to 'the chapter of accidents,' to prevent any actual harm.

"The chief objection to any change seems to be a fear that the old practice of legislative contests for charters will be revived. Free railroad law is said to have saved us from the evils attendant on that practice. Now there are three answers to this objection:

1. No one proposes to go back to the old practice. The Governor does not. The Board does not. It is proposed to create a tribunal to prevent the need of applications to the General Court.
2. The Free Railroad Act is not the sole cause of the relief from railroad lobbying at the State House. The great reduction in the amount of railroad construction is a material cause of the change.
3. The General Act does not forbid applications to the Legislature for charters. It allows such applications and specifies the mode of making them. And no law can forbid them while the right of petition is held sacred.

"The formation of a tribunal involves some difficulties. But you are sent here to grapple with difficulties. The Governor proposes the railroad commissioners. When I differ with Gov. Long, it seems to me, *prima facie*, that I am wrong. But there are objections to having any fixed board pass upon the local questions pertaining to the grant of a railroad route. The case should be tried by 'the vicinage.' If, for instance, a road were wanted in Berkshire, the good people of that county would not be quite satisfied to have three men come up, two of them from Boston, and tell them whether they needed a railroad. They would prefer that some of their neighbors should have a voice in the decision. Centralization of power is to be avoided when it can be; and it is centralization to submit a local question wholly to a state board."

In closing, the Chairman spoke as follows:  
"I do not greatly fear any argument that has been urged



against this bill, or any fact that has been proved in regard to it. I do fear the influence of good names arrayed or cited against it. Let me remind you that this is not a question of names or authority, or of expert testimony. It is not a technical railroad problem, but a question of state policy, a question of right or wrong, on which the opinion of one citizen is just as good as that of any other. If this were a question of the proper basis for a combination of trunk lines, or of the just division of receipts, I should at once yield to the weight of authority. But on the question whether a man's property shall be taken against his will, without proof of public exigency, the best witness we can call is one who never saw a railroad. And I offer the testimony of John Adams, who wrote the Constitution of Massachusetts, and who placed in the tenth article of the bill of rights these words: "Whenever the public exigencies require that the property of any individual should be appropriated to public uses, he shall receive a reasonable compensation therefor." He did not place in the bill of rights a provision that property should not be taken against its owner's will, unless there was an exigency for public use. That would have only weakened a principle which exists independent of all constitutions. That principle he knew would remain if the constitution should be rejected by the people. That fundamental law is in force wherever a tribe of Indians advances far enough to build permanent wigwams. And so, by a felicitous use of language, this principle is implied in our bill of rights, instead of being stated; and the courts have always recognized it.

"So of the second proposition on which this bill rests—that no man shall be judge in his own case. All the railroad and legislative experience in the world would not add to the wisdom and justice of Blackstone's declaration, already cited, that a man cannot be made judge of his own cause. On these two propositions—a man's right to his property unless it is proved to be needed by the public, and the wrong of making a man judge in his own case—on these two this bill depends.

"It is repeated that no road will be built unless it is needed, and that the proof of exigency is furnished by a subscription. But, as I have said before, this statement is made in the face of a thousand facts. Every useless road, every worthless and bankrupt railroad corporation in existence, is an answer to this argument. Essex County alone shows that the imagined security is no security, and that the furnishing of capital is no proof of exigency. Still less is a subscription a security against a black-mail route—a route which is designed to be bought off and not to be built. Here no capital is risked, and very little money is to be spent.

"This bill is said to be a repeal of the General Railroad Act, and a renewal of the system of special charters. But no one asks to repeal the General Act; and this bill provides a tribunal to obviate the necessity for special charters. Of course, petitioners could go to the Legislature, if this bill passed, just as they can now; but the General Court would refuse to hear them, just as they do now. When the proper tribunal acted, the case would be settled. If in any exceptional case a charter were granted, it would still be subject to all the safeguards of the General Act. The methods pursued by petitioners under the old system were bad; but the end gained was, at the worst, only what is now enacted; namely, that anybody could build a railroad anywhere, whether it was needed or not. Finally, on this point too much is claimed for the law. Lobbying for charters would have ceased when our railroads had been built, and the mania for charters had ceased.

"The chief objection seems to be that no evil has actually happened under the law. Evil is possible; frauds and outrages can be perpetrated; but you are asked to wait until they have succeeded, before a remedy can be applied. Wait till some greedy speculator has pocketed his ten or fifty thousand dollars; then come for legislation. Is it absolutely necessary that the horse shall be stolen before you will allow the stable door to be locked? This used to be the test of wisdom and unwisdom. The prudent man sees danger afar off. But this danger is not so far off. It has come very near us; so near, that at one time propositions were before the Board which would have been destructive of the rights of property in Boston. One lively newspaper declared that if the Board refused routes the Supreme Court would compel them to do so by *mandamus*, and if they granted routes the people's indignation would sweep away the law, and the Board with it. 'My learned brother' has told you of actual scandals perpetrated under the law. If my honored predecessor had remained on the Board he would have seen these evils, and would probably have pleaded for this bill to-day.

"I say this with more confidence, because his colleague and mine, Mr. Briggs, whose worth we all know and whose illness we all lament, has changed his views on this subject. He favored the General Act just as it was. He was not quite satisfied last year; but this year, because of what he had seen and of what he feared, he took a deep interest in that portion of our report which favored such a bill."

To this it may be added that the general law sometimes works in a way not expected by its promoters. In former times much was said of strategic charters, meaning charters obtained by the friends of existing corporations, not for the purpose of building a road, but for the purpose of preventing a rival road or branch from being built. The general law, without an exigency clause, gives strategic charters in blank to all existing roads.

It is easy to suppose a case where a community desires a new outlet for traffic, and where an existing railroad company is willing to favor and aid the enterprise, but where it is prevented from doing so by the threat of a rival company, that, if it does, a branch will be constructed which will divert trade from the offending corporation. It is believed that such a case is not an imaginary one.

The opponents of any change in the present law sometimes argue that they wish to promote the free building of railroads, and imply that the friends of an amendment wish to check construction. It is, indeed, desirable to prevent the building of unnecessary roads; but the law as it now stands may be used to prevent the construction of roads needed and desired.

Another result of the present law, which has received little notice, is the possible creation of many practically irresponsible railroad corporations. A charter is obtained for a road two miles long with a capital of twenty thousand dollars. A single accident might render the corporation bankrupt; and, in case of a serious collision, there would be no redress for the injured parties. The chances of accident are at least as great, in proportion to mileage, on a short road as on a long one; and, if the shorter road is used chiefly for crowded excursions, they are greater. Of course, a man who buys a railroad ticket does not contemplate an accident with resulting damages. But it deserves consideration that the most dangerous traveling in this state is done without any chance of redress in case of serious injury. This fact may not be a reason for refusing charters to small corporations, but it reinforces the argument against giving such charters when the public good does not demand them.

The subject is a difficult one. The formation of a tribunal is not easy, but the matter is important in principle, and likely to become so in practice; and the Board has felt bound to place its views on record once more.

### Logging Railroads and Their Rolling Stock.

A correspondent of the *Northwestern Lumberman* writing from Grand Rapids, Mich., says:

No time could be more appropriate than this to learn something about log-hauling machinery, and not knowing a better place to learn it than at the office of Messrs. Butterworth & Lowe, manufacturers of logging cars and trucks, I called around there. I am sure that every man who takes an interest in logging will be interested in Mr. Lowe's conversation, and that many of the readers of the *Lumberman* will profit by it. "Mr. W. S. Gerrish," said Mr. Lowe, "put in the first logging railroad in 1876. It ran north from Farwell. It was looked upon as a speculation, and in certain directions Mr. Gerrish was called a fool. His cars were made in Cleveland. We began the manufacture of cars in 1877, and to start with we got a bad name. We did not understand how to make durable wheels. To do our best, occasionally a bad wheel would come back, and we gave up the business of wheel making in despair. At that time we had ten tons of wheels on hand, and we broke them up and used the iron for other purposes. The experiment cost us several thousand dollars. For two years we bought our wheels from other manufacturers, and not liking to do that, we took a new start, and have met with success. The best car wheels in the world are made in America, and I believe we give the best guarantee on our wheels of any car-makers in the country. Every car is sent out with the guarantee that if within six months a wheel shows an original defect it is replaced free of charge. Unchilled wheels have been tried because they can be turned perfectly smooth and true, but they do not stand the wear and have been discarded. Nothing short of a grindstone will touch a chilled wheel. We make no trucks or cars except on order. Every man has an idea of his own, and wants his cars a little different from anybody else's. He may want the axle made extra strong, a change in the shape of the boxes, or timbered according to his own whim. Then, on cars for uneven ground, more brakes are required. The first logging cars were made with four wheels, but now they all have eight, as with eight wheels there is less wear on the rail, less draft on the power, and they turn curves more readily. An eight-wheel car will also carry a heavier load than a four wheeled one. Our trucks are made for a ten-ton load, but they are loaded with fourteen tons, or often with as many logs as can be made to stay on. The logging railroad business is increasing every year. The South is opening up and the inquiries from the Southern states are numerous. Operators down there write us often, and want to know how to make their roads. We have orders from Florida, Texas and the Carolinas. Even here in Michigan many of the operators would not depend on snow were there any guarantee that we would get it. With logging roads they can haul for nine months in the year, and work steadily. They know just what they will be able to do right along, and are not obliged to keep a look out for men and teams for a rush." "We are very busy," said Mr. Lowe, as I was leaving the works, "and I don't know when I have talked so long before."

Mr. Lowe thinks highly of pole roads, and has made a car especially for use upon them. It is very simple in construction, and adapts itself to both the lateral and vertical irregularity of a pole road. The wheels, axles and grips for holding the axles to the timbers, weigh 2,200 pounds, and are furnished for from \$95 to \$100 per set, complete. The frame of the car is very simple in construction, and any man who is handy with tools can make it. The iron work of the car is sent out in this shape both to save freight and to save money to the logger, who generally prefers to do any work he can, and thus save the shop profits. Eight wheel cars are furnished at from \$110 to \$290 each. The cheaper ones have no springs, can be run ten to twelve miles an hour, and are as durable as the higher priced ones.

This establishment is now working seventy-five men and running to the full capacity of the machinery. Additions have been erected, and more machinery will be put in the coming season. For car wheels six kinds of iron are melted together, and to know that it is rightly proportioned a section of a wheel is cast and then broken and examined by an expert. If everything is right the casting goes on; if anything is wrong it is righted.

Mr. Lowe estimates that there are 200 miles of logging railroad in Michigan, but I have heard it placed at 400 miles, and in one instance, by an extensive operator, at 500 miles. Mr. W. S. Gerrish's road at Pinconning is 15 miles long, which is the longest in the state.

### Transportation in Congress.

In the House on the 4th:

In Committee of the Whole on the Post-Office appropriation bill, amendments were offered to reduce the amount appropriated to carry the mails over the St. Louis bridge; to authorize the Postmaster-General to require mails to be carried on the fastest trains without extra compensation, and to reduce compensation when mails are not carried on the fastest trains. The Committee rose without acting on the amendments.

In the Senate on the 5th:

Mr. Sewell, from the Committee on Military Affairs, reported favorably on the bill granting the Central Railroad Company of New Jersey the right of way through the property of the United States near Dover, N. J., on which is the Picatinny powder depot. The passage of the bill is recommended by General Benet, Chief of Ordnance.

In the Senate on the 6th:

Mr. Morgan, from the Committee on Public Lands, reported favorably, with amendments, the bill granting the right of way over the public lands in Alabama, and to grant lands to said state in aid of the Gulf & Chicago Air Line Railway Company. Mr. Plumb, on behalf of the minority of the committee, said they would present their views in opposition to the bill hereafter.

In the House on the 6th:

Mr. Cobb offered a resolution calling on the Secretary of the Interior for the names of all railroad companies to which the government has granted lands to aid in the construction of their roads, and the names of all states and railroad companies to which public lands have been granted for the benefit of said companies, which have not completed their roads within the time provided by law; the amount of land involved in each grant, and the amount disposed of by each of said railroad companies and states. He is also directed to communicate the date of all acts of Congress relating to said grants, the number of miles of said railroads completed under the provisions of the acts making such grant, as well as the number of miles remaining incomplete at the date when such acts require the completion of the same. Information is also asked for as to the names of each of said railroads and the states which are required by law to reimburse the Government for moneys expended in surveying and selecting said lands. Referred to the Committee on Public Lands.

Mr. Belford, of Colorado, introduced a joint resolution for the printing of 100,000 copies in English and 50,000 copies in Spanish of a book entitled "The Three American

Railway," favoring the construction of a railway from the United States to the South American states. Referred.

In the House on the 7th:

Mr. Aldrich offered a resolution calling on the Secretary of War for information as to the authority by which the railroad bridge across the St. Joseph River near its mouth is permitted. Adopted.

### Bessemer Steel Works in the United States—Production in 1881.

[From the *Bulletin of the American Iron and Steel Association*, Feb. 8.]

We have received complete statistical reports from all the Bessemer steel works in the United States, giving their production of ingots and rails in 1881.

The total quantity of Bessemer steel ingots produced in the United States in 1881 was 1,539,157 net tons, or 1,374,347 gross tons. The production in 1880 was 1,203,173 net tons; in 1879, 928,972 net tons; in 1878, 732,226 net tons. The increased production of 1881 over 1880 was 335,984 net tons, or 28 per cent.; over 1879 it was 610,185 net tons, or 66 per cent.; and over 1878 it was 806,931 net tons, or 110 per cent. The production of Bessemer steel ingots in this country in the ten years from 1872 to 1881 has been as follows, in net tons:

Years.	Net tons.	Years.	Net tons.
1872.....	120,108	1877.....	560,587
1873.....	170,652	1878.....	732,226
1874.....	191,933	1879.....	928,972
1875.....	375,517	1880.....	1,203,173
1876.....	525,960	1881.....	1,539,157

Bessemer steel ingots were produced in 1881 by 13 works, of which 7 are in Pennsylvania. Two new works, both in Pennsylvania, produced Bessemer steel in 1881 for the first time. These works are those of the Pittsburgh Bessemer Steel Company, Limited, located at Homestead, near Pittsburgh, having two converters, and the Pittsburgh Steel Casting Company, of Pittsburgh, having but one converter. The Pittsburgh Bessemer Steel Company, Limited, made its first blow on March 19, 1881, and the Pittsburgh Steel Casting Company made its first blow on Aug. 26, 1881. Some extensions were made to old works in 1881, and two new works are in course of erection now. A comprehensive exhibit of the Bessemer steel works of the country completed and in progress is as follows:

NAMES OF COMPANIES.	Converters.	
	Completed.	Building.
Albany & Rensselaer Iron & Steel Co., Troy.....	two 6½-ton.....	
Bethlehem Iron Co., Bethlehem.....	four 7-ton.....	
Pennsylvania Steel Co., Steel-ton.....	two 6½-ton.....	
Lackawanna Iron & Coal Co., Scranton.....	three 8-ton.....	
Cambria Iron Co., Johnstown.....	two 7½-ton.....	
Carnegie Bros. & Co., Limited, Bessemer.....	two 6-ton.....	
Pittsburgh Bessemer Steel Co., Limited, Homestead.....	three 10-ton.....	
Pittsburgh Steel Casting Co., Pittsburgh.....	two 4-ton.....	
Cleveland Rolling Mills Co., Cleveland.....	one 7-ton.....	
North Chicago Rolling Mill Co., Chicago.....	two 6½-ton.....	
Union Iron & Steel Co., Chicago.....	two 10-ton.....	
Joliet Steel Co., Joliet.....	two 5½-ton.....	
Vulcan Steel Co., St. Louis.....	two 5½-ton.....	
Scranton Steel Co., Scranton.....	two 4-ton.....	
Colorado Coal & Iron Co., South Pueblo.....	two 5-ton.....	
Total.....	31	8

Only thirty converters were in use in 1881, as Carnegie Brothers & Co., Limited, have substituted a 3-converter plant since the close of the year for their 2-converter plant. The new works at Scranton, Pa., and South Pueblo, Col., and the extension of the North Chicago Rolling Mill Company's works will probably be in operation some time during the first half of 1882.

The American producers of Bessemer steel rolled 1,253,129 net tons, or 1,118,865 gross tons, of Bessemer steel rails in 1881. But this is not the whole quantity of Bessemer steel rails rolled in the United States in that year, as quite a large quantity, estimated in the neighborhood of 100,000 gross tons, was rolled by iron rail mills from imported blooms. The total production of Bessemer steel rails in 1881 was therefore about 1,200,000 gross tons, as we some time ago estimated it would be, but the exact figures cannot be given until we receive full statistical reports from the iron rail mills of the country. The following table shows the growth of our production of Bessemer steel rails in the 10 years since 1872, the qualifying statement in regard to 1881 being borne in mind:

Years.	Net tons.	Years.	Net tons.
1872.....	94,070	1877.....	432,169
1873.....	129,015	1878.....	530,398
1874.....	144,944	1879.....	683,964
1875.....	290,863	1880.....	934,400
1876.....	412,461	1881.....	1,365,129

### Shavings in the Floors of Cars.

A correspondent of the *New York Sun* says: "In all the evidence given at the Spuyten Duyvil inquiry there was none to show why those cars burned up so quickly. When a drawing-room or sleeping car is built from 15 to 20 bushels of shavings from a planing machine are put into the space between the floor and the false floor. The floor timbers are 6 by 9 inches, so there are nine inches of shavings trodden down hard by the men as they put them in before the upper floor is laid. Now it will at once be apparent why the Idlewild and Empire flashed up so quickly. In my opinion if there had been no shavings, as stated, Mr. Wagner and some of the others might have been taken out alive, to say the least. The shavings were put in to deaden the noise and for warmth by Mr. Wagner's orders."

We have no means of knowing certainly whether the spans below the floors of the cars referred to were or were not filled with shavings, but we do know that it is a very common practice to use such material in that way. That it makes a car very much more combustible than it would be if the floor spans were filled with some material which would not burn is plain, and therefore there is good reason for condemning and abandoning the practice.

### One Cent per Mile.

The Pennsylvania Railroad Company has deprived all its employes of passes. At its shops on the Hackensack Meadows are several hundred workmen; all of whom live in Jersey City or Newark. To accommodate these men the company runs two special trains every night and morning from the shops, one of them to Newark and the other to Jersey City. The men are now obliged to pay one cent per mile.

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#### EDITORIAL ANNOUNCEMENTS.

**Passes.**—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

**Addresses.**—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN OPINIONS, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

#### THE WESTINGHOUSE BRAKE.

In the first reports of the Spuyten Duyvil accident it was said that the wrecked train was stopped by the Westinghouse automatic brake "going on," or "creeping on of itself." Later investigations showed that this was a mistake, and it appears now that the brake was applied by a passenger pulling the safety cord inside of one of the cars. Although the early reports were erroneous and did great injustice to the Westinghouse brake, nevertheless the occurrence of the accident under such circumstances has led to a great deal of consideration and discussion of the action and of the management of the brake, to which subject this article will be devoted. It has happened, too, that while the various investigations of the causes of the Spuyten Duyvil accident were going on here, the report of the inspector of the British Board of Trade in the Blackburn accident, which occurred last August, has been published, and its substance been given in the last English engineering papers which have been received here. This accident was caused by a train running into the Blackburn station and coming into collision with an engine engaged at the time in "shunting" a part of a standing train. Seven passengers were killed and 64 injured. The accident was attributed by Colonel Yolland, the Board of Trade Inspector, to the "failure of the brake to act properly when required to prevent a collision which was primarily caused by a failure of the permissive block system." The testimony to sustain this inference was not at all conclusive, and rested almost entirely on the evidence of the locomotive runner and fireman, who were, of course, witnesses prejudiced by their own responsibility for what occurred. After the accident the brake on the train was tested and found to be in perfect working order, and a number of witnesses testified that they felt the brake go on while they were on the train. Whether the collision was caused by the brake failing to act, or by the locomotive runner failing to apply it in time, it is a question on which at this time and this distance of course no new light can be shed. It may be said, though, that the inference of Colonel Yolland seems to be supported by a very weak thread of evidence, as he admits himself. It is probable, too, that very little interest will be felt here concerning the above questions, but the following extract from his report probably expresses in words what has been running in many railroad managers' minds in this country since the occurrence of the accident referred to. Colonel Yolland says:

"No one can question, I imagine, the desirability of the continuous brakes being made, 'in case of accident, self-acting,' if that can be accomplished without introducing any other element of danger. The self-action can probably do no harm in such cases, and in some may do good; but it is quite a different thing when any of these continuous

automatic brakes become self-acting when there is no accident, and suddenly arrest the progress of a train when it is not required by the driver to be stopped; or, on the other hand, refuse to go on and act, from any cause whatever, when the driver desires to pull up his train in order to stop at a 'danger' signal, or at the proper spot at a station, or to avoid any obstruction whatever which he may suddenly come upon, such as cattle straying on the line. No great harm is done, so far as the public safety is concerned, by the brakes suddenly going on without any action on the part of the engine-driver, where the traffic is strictly worked on the absolute block system, and two trains are not permitted to be on the same section of the line between two signal-boxes at the same time, beyond the delay thus occasioned, which, however, is frequently a great nuisance to the passengers; but the case is altogether different where failures take place in the working of the absolute block system, or where it is replaced by the permissive system, as through Blackburn station, and two trains are allowed by the system of working adopted, or by mistake on the part of one of the signalmen, to be on the same section at the same time—and collisions take place like that in the Bleanoor Tunnel, on the Midland Railway, on Aug. 19, 1880, when three passengers were injured, and that at Bow road station, on the Stepney and Stratford branch of the Great Eastern Railway, on the 3d ult., when eleven passengers are returned as having been injured, and the driver and fireman of an engine of the following train sustained fatal injuries, and died on the spot, from the action of the brakes suddenly stopping the leading train where no stoppage was required, and where the engine-driver did all in his power to avoid the stoppage. It is quite true that, if the signalmen concerned in both these cases had done their duty in correctly working the block system, the collisions would not have occurred; neither would they have happened had not the trains been unnecessarily stopped by the action of the brakes."

The question of the relative merits of automatic and non-automatic brakes has excited a great deal of discussion in Great Britain. Here railroad managers have practically decided in favor of the former by adopting the Westinghouse system, and the British Board of Trade has also recommended automatic action for all continuous systems of brakes. Considering the diverse views held in Great Britain on this subject, and the attitude which the Board of Trade has occupied towards it, it is not remarkable that a report, like that from which we have quoted, has resulted in stirring up considerable interest and feeling in the matter. At any rate the Board of Trade and its inspector, Colonel Yolland, seem to be at variance in their opinions, and, what is said to be an exceptional occurrence, the report of the latter is published with a memorandum of the President of the Board of Trade attached thereto. In this memorandum it is said:

"Colonel Yolland also concludes, from the evidence taken at the inquiry and from the experiments subsequently made, that some of the mechanism of the brake with which the train was fitted had become out of order, and that the brake consequently failed to act properly when required to prevent a collision, which was primarily caused by a failure of the permissive block system. This conclusion is not founded on such direct and positive evidence as to place it beyond doubt, but on inferences drawn from a variety of circumstances. On the other hand there is evidence that the brake was in order, and had acted properly on this journey at the preceding stations at which the train had stopped."

"With regard to the alleged failure of the brake the company's attention must also be directed to the suggestions which Colonel Yolland has made respecting the imperfections of the brake and the remedies which, in his opinion, would remove present causes of failure. But it must be remembered that all mechanical contrivances are at times liable to get out of order, and continuous brakes are no exception to this rule, particularly as they have to be fitted to trains composed of large numbers of carriages, often requiring to be interchanged on a journey, thus involving repeated coupling and uncoupling of the carriages and the repeated connection and disconnection of the brakes. The company's attention ought, therefore, to be directed to the necessity of giving most careful instructions and warning to those who are intrusted with duties, upon the proper performance of which the due operation of the brakes necessarily depends."

The fault which Col. Yolland finds with the brake, "that collisions take place from the action of the brakes suddenly stopping the leading train where no stoppage was required," is one which of late has frequently been made in this country, and it is to the consideration of this question chiefly that this article will be addressed.

The Westinghouse automatic brake, as most of our readers know, is constructed upon the principle that whenever anything gets out of order it will apply the brakes and stop the train, and thus gives no ice that something is wrong. The principle is analogous to that employed as a safe guard with boiler screw stay-bolts, which are very liable to break without giving any indication of their fracture. To make the latter known, when it occurs, the bolts are sometimes made tubular, or as they almost invariably break next to the outside plate, a hole is drilled into the outer end of each bolt, so that when the bolt breaks the fact will be indicated by the leakage through the hole. A similar principle is employed with semaphore signals, which are worked at a distance with a wire. The signal arm is counter-weighted so as to be raised to indicate danger or stop in case the wire breaks. Now doubtless it is annoying to have a train delayed by the breaking of a signal wire; nevertheless, few persons at all acquainted with the subject would argue that it would be worse to have the signal indicate line clear

\* The italics are ours.

after the iron by which it was controlled was broken. The frequent occurrence of such delays might be a reason for a more rigid inspection and possibly for improvement in the quality or strength of the wire, but not for increasing the risk of having the signal indicate line clear when it might be quite otherwise. The same reasoning may be applied to the stay-bolts. In fact, in one case a Locomotive Superintendent of a prominent line drilled the stay-bolts in his boilers, and after they had been in use some time the division master mechanics objected to their use, because, they said, they gave so much trouble by leaking. There is no sworn statement on the subject, but tradition says that the reply of their superior officer was, "Damn it, that is what I want them to do—when they break."

There can be no doubt that some of the objections made to the Westinghouse brake are as unreasonable and as illogical as those made by the master mechanics to the use of drilled stay-bolts. The first result of the breaking of the latter or of the stopping of a train by automatic acting of the brakes, is to give those in charge of the mechanism more or less trouble, and they are therefore apt, thoughtlessly or ignorantly, to condemn the whole principle. It might be said that in one sense the purpose of the automatic action in the stay-bolt and in the brake is to give trouble. It is to compel those in charge to remedy a less evil, in order to avoid a greater one, or, to repeat what was said in these columns a few weeks ago, it is safer to have a brake which will stop a train when you don't want to stop than to have one which may fail when you do want to stop.

But some one will say, we have found by experience that the drilled stay-bolts leak so often that they are a serious hindrance to the regular performance of the service of the locomotives, and the automatic action of the brakes interferes seriously with the prompt running of our trains, owing to the delays caused thereby. Obviously, it would no more be wise in the former case to avoid leakage and assume the risk of explosion, than it would be in the latter to prevent delays and encounter the danger of collisions. If the breakage of stay-bolts occurs with undue frequency, it suggests that they have been deteriorated by corrosion or some other cause, and indicates that more frequent or more rigid inspection of the boiler is required. The same may be said of the brakes, only its force is very much greater in the latter case than in the other. An automatic brake is necessarily a more or less complicated mechanism, and just in proportion to its complication is it important that it should be well taken care of. There could be only one answer to the question, whether it would not be desirable to have an equally efficient brake, which would be simpler than those in use, and which would therefore require less care. The decision in this country, though, has been so positively in favor of the superiority of the Westinghouse automatic brake for fast and heavy trains that the inquiry here assumes the practical form of finding one which is simpler than that and equally or more effective. Until such a brake is found, the obvious and simple duty of railroad managers is to avoid delays to trains by keeping the brakes in as good a condition as possible. Experience has shown that the automatic brake is quite too delicate and complicated a mechanism to intrust to the care of ignorant or careless hands. So is a locomotive, for that matter, an injector, a Baker heater or a sleeping car, and experience has abundantly shown that the only way to keep continuous brakes in thoroughly good working order is to have a competent person placed in charge of them whose duty it shall be to see that the apparatus on every engine and car that goes out is in good condition.

It is not only essential that the brakes should be in good condition, but it is also important that those required to do so should know how to use them. The advice of the President of the British Board of Trade, which we have italicized, could hardly be made more forcible. To emphasize it we will repeat it: "THE COMPANY'S ATTENTION OUGHT, THEREFORE, TO BE DIRECTED TO THE NECESSITY OF GIVING MOST CAREFUL INSTRUCTIONS AND WARNING TO THOSE WHO ARE INTRUSTED WITH DUTIES, UPON THE PROPER PERFORMANCE OF WHICH THE DUE OPERATION OF THE BRAKES NECESSARILY DEPENDS."

There can be no doubt that in this country a great many of those "who are intrusted with duties, upon the proper performance of which the due operation of the brakes necessarily depends," are not instructed how to perform these duties. It will be remembered that the lamentable accident which occurred on the West Jersey & Atlantic road was due to the ignorance of the locomotive runner of the working of the automatic brake. A gentleman informed us, while this article was in process of incubation, that on a prominent trunk line recently the train on which he was traveling



was stopped by the brakes "creeping on," and that the only employes on the train who seemed to have any idea how to release them were the colored porters on the sleeping cars.

There can be no safety in this matter unless each railroad company will subject all of its employes who are required to operate the brake to an examination, and require them to have a reasonable understanding of its construction and operation. Means should also be provided for giving the employes the required instruction.

It would be absurd to say that there is no room for improvement in the Westinghouse automatic or any other brake. A mechanism which would require less care, was easier understood, which would never cause unnecessary delay to trains, undoubtedly is desirable. As the case stands now, though, the railroad managers of the country have decided that it is the most efficient brake known, and therefore the wise course to pursue is to take the best care and make the best use of it that is possible, until something better is provided. It is certain that neither the Westinghouse nor any other brake is so perfect that it will take care of itself.

It is irrational to say that there is no danger in stopping a train when no stoppage is required. In doing so one of the elements of a collision is provided, which is a train to be run into; and all that is needed is another to run into it to complete the catastrophe. Of course, if the block system is used, a collision is impossible; but it is only necessary to have in conjunction with a delayed train a failure of the block system at the same time and place to produce a collision. Of course, the fact that the two must occur at the same time and place makes the probability of such an accident very slight; still, as was said before, delaying or stopping a train supplies one of the required elements of a rear collision, and it is undoubtedly an objection to a brake if it causes unnecessary delays, and this objection is proportionate to their frequency.

#### EXPORTS AND IMPORTS.

The exports and imports at the several ports have been reported for the year 1881, and we are able to compare the relative positions of the several cities and see the progress they have made. The values of exports and imports in 1880 and 1881 were:

Exports:	1881.	1880.	Inc. or Dec.	P. c.
New York.....	\$373,102,953	\$416,092,772	D. \$42,989,819	10.3
Boston.....	70,408,879	67,838,290	I. 2,570,589	3.8
Philadelphia.....	41,225,364	46,647,218	D. 5,421,854	11.6
Baltimore.....	55,780,797	74,410,009	D. 18,629,212	25.0
New Orleans.....	90,505,222	102,749,227	D. 12,244,005	11.9
San Francisco.....	47,468,184	29,225,261	I. 18,242,923	62.4
Other ports.....	155,022,730	152,750,579	I. 2,272,151	1.5
Total.....	\$833,514,129	\$880,683,422	D. \$47,169,293	5.3

There is a small increase in export values at Boston; an enormous one at San Francisco; but at the other four places named a large decrease. The percentage of decrease is much the largest at Baltimore, and is a little larger at Philadelphia than at New York.

If we take the exports of New York, Boston, Philadelphia and Baltimore by themselves (these ports competing with each other and only to a slight degree with other United States ports), we will find the percentage of their aggregate exports shipped from each to have been:

	New York.	Boston.	Philadelphia.	Baltimore.	Total.
1881.....	60.0	13.0	7.7	12.3	100.0
1880.....	68.6	11.2	7.7	12.3	100.0

New York and still more Boston have advanced in position as exporters, wholly at the expense of Baltimore, Philadelphia remaining unchanged. This is very different from the course of the breadstuffs exports. In these Philadelphia fell much more than any other place. But Philadelphia has gained largely in the exports other than flour and provisions, and Baltimore has not. These "other" exports were at the four places:

	1881.	1880.	Inc. or Dec.	P. c.
New York.....	\$183,821,435	\$181,253,239	I. 2,568,195	1.4
Boston.....	30,543,119	27,884,608	I. 2,658,511	9.5
Philadelphia.....	17,148,308	13,219,482	I. 3,928,826	30.7
Baltimore.....	16,032,694	12,215,496	D. 3,817,198	31.2
Total.....	\$247,545,556	\$234,572,825	I. \$12,972,731	5.5

The grain and provision exports were 53½ per cent. of the total export values in 1881 and 60½ in 1880. The chief exports of the country, aside from grain and provisions, are cotton, tobacco and petroleum. Only New York and Philadelphia have large petroleum exports; New York only of the above four ports has considerable cotton exports. The grain exports are the only ones that seem liable to great diversions from one port to another, and the places which have large exports other than grain have a comparatively stable business. The percentage of total export values at each place which was formed by the exports of breadstuffs and provisions was:

	New York.	Boston.	Philadelphia.	Baltimore.
1881.....	50.7	56.6	58.4	71.3
1880.....	56.4	58.9	71.6	78.8

The provisions go chiefly from New York and Bos-

ton (more than 90 per cent. of them), and last year they formed 26½ per cent. of their exports, against 19 per cent. of the Philadelphia and 8 per cent. of the Baltimore exports. At Boston the value of provision exports last year was two-fifths more than that of the breadstuffs; at New York only a little less.

This is an important feature in the position of the different ports. New York and Boston have a well-developed export trade, ships sailing thence to almost all parts of the world with which we have any export or import trade, and taking all kinds of goods that we export. Philadelphia and Baltimore have heretofore exported but little grain, and the vessels thence are almost entirely to the countries to which we export grain. Philadelphia, however, is developing a more varied export trade, ships some provisions and a large amount of petroleum, and, as we have seen, in this year, in which its grain exports fell off enormously (\$9,700,000), had a comparatively small loss (\$5,400,000) in exports; while Baltimore lost \$955,000 in provisions and \$1,200,000 in other exports, in addition to its loss of \$16,450,000 in grain. Philadelphia appears to be approaching the position of Boston, though still with a long interval. Its large petroleum exports make its position appear better in 1881 than it really was; petroleum being a simple freight like grain, whose export appears not to help import business or a general and varied export trade.

But we need to examine the imports in order to learn the commercial importance of the several cities. These were:

Imports:	1881.	1880.	Inc. or Dec.	P. c.
New York.....	\$453,542,053	\$480,127,042	D. \$26,584,989	5.5
Boston.....	64,716,040	68,649,083	D. 3,933,043	5.7
Philadelphia.....	29,702,668	38,933,832	D. 9,231,164	31.1
Baltimore.....	16,278,947	18,637,592	D. 2,358,645	12.7
New Orleans.....	12,182,602	11,661,242	I. 521,360	4.5
San Francisco.....	38,451,301	37,300,624	I. 1,150,677	3.1
Other ports.....	55,184,172	41,497,761	I. 13,686,411	33.0
Total.....	\$670,117,903	\$696,807,176	D. \$26,689,273	3.8

There is no considerable increase of imports, except in the aggregate of the unnamed ports, whose share is but a twelfth of the whole after all. Among the four Eastern ports, New York and Boston have the smallest percentage of decrease, Philadelphia and Baltimore very large ones, the former suffering especially. Taking these four ports together, the percentage which each had of their aggregate imports was:

	New York.	Boston.	Phila.	Baltimore.	Total.
1881.....	80.4	11.5	5.3	2.8	100.0
1880.....	79.2	11.3	6.4	3.1	100.0

New York and Boston imported 91.9 of the aggregate imports of the four ports in 1881, against 90.5 in 1880.

Again we call attention to the overwhelmingly large proportion of the imports arriving at these two cities. It is just as notable, or rather more so, when we compare with all other United States ports. They imported 77.4 per cent. of the total United States imports in 1881 (against 78.7 in 1880), while their exports were but 53.1 per cent. of the whole in 1881 and 54.4 in 1880. This is largely due to the fact that while there are very large cotton exports from the South Atlantic and Gulf ports, they import very little indeed, getting their imported goods chiefly from New York. Thus 10.9 per cent. of the exports were from New Orleans last year, but only 1.8 per cent. of the imports entered at that port.

This concentration of the imports at two ports in the northeastern corner of the country, coupled with the existence there of a great and varied export trade, gives them a great commercial advantage. They depend much less on the grain export trade, and are at the same time better able to command it, especially when it is not unusually large, because the vessels come there with and for other freights.

#### Grain Movement in January.

For five successive years the grain and flour receipts and shipments at the eight Northwestern markets and the receipts at the seven Atlantic ports have been, in bushels, during the four weeks ending Jan. 28:

	1878.	1879.	1880.	1881.	1882.
Northwestern.....	16,248,396	18,580,389	19,006,498	18,429,254	22,731,277
Atlantic.....	11,111,159	9,027,547	8,707,618	12,721,302	14,455,543
Total.....	27,359,555	27,607,936	27,714,116	31,150,556	37,186,820

The Northwestern receipts this year were thus 23.4 per cent. more than last year and larger than in any previous year.

The shipments of these markets were 11.3 per cent. more than last year and 66 per cent. more than in 1880, and larger than in any other year; but the Atlantic receipts were 26 per cent. less than last year, and much smaller than in any other year of the five. Heretofore for many years the Atlantic receipts have greatly exceeded the shipments of these Northwestern markets. But while there was an excess of 8,600,000 bushels in 1878, 6,750,000 in 1879, 9,700,000 in 1880, and 4,400,000 in 1881, this year the Atlantic receipts are 1,700,000 bushels less than the Northwestern shipments.

This indicates that shipments from interior Western routes through to the East have been unusually light this year, and as prices at the Western markets have been comparatively higher than at the East, and the lowest rail rates were not usually made from interior points but chiefly from the great markets, and most of all from Chicago, this perhaps was to be expected.

For the five weeks ending Feb. 4, receipts and shipments (including flour) at Chicago and Milwaukee were:

	1882.	1881.	Increase.	P. c.
Receipts.....	16,920,737	12,061,734	4,859,003	40.3
Shipments.....	13,146,199	10,253,815	2,892,384	28.2

The increase at these two places in the five weeks is greater than the total increase of the eight markets for the four weeks.

The shipments this year were the largest ever made in a winter month, and yet the receipts exceeded the shipments by 3,774,538 bushels, while the excess last year was but 1,807,919 bushels.

For three successive years receipts of grain of all kinds (but not flour) at the eight reporting Northwestern markets for the four weeks ending Jan. 28 have been, in bushels:

	1882.	1881.	1880.
Chicago.....	7,685,370	4,374,762	5,741,778
Milwaukee.....	2,019,412	1,504,545	1,461,691
Toledo.....	921,157	975,384	861,965
Detroit.....	349,015	547,067	447,812
Cleveland.....	233,595	349,600	339,040
St. Louis.....	3,089,135	1,762,839	3,399,475
Peoria.....	2,008,325	1,810,105	1,230,250
Duluth.....	109,080	.....	.....
Total.....	16,995,089	11,928,302	13,381,939

	1882.	1881.	1880.
Chicago.....	45.1	41.7	42.9
Milwaukee.....	11.9	12.6	10.9
Toledo.....	5.4	8.2	6.4
Detroit.....	2.4	4.6	3.4
Cleveland.....	1.4	2.9	1.8
St. Louis.....	18.1	14.8	25.4
Peoria.....	15.4	15.2	9.2
Duluth.....	0.6	.....	.....
Total.....	100.0	100.0	100.0

The four large markets—Chicago, St. Louis, Peoria and Milwaukee—all have much larger receipts this year than last, and all of these but St. Louis larger than in 1880 also. The changes in percentage, compared with 1881, are chiefly large gains at Chicago and St. Louis, and large losses at Toledo, Detroit and Cleveland. Compared with 1880 there is a very large gain at Peoria, nearly balanced by a very large loss at St. Louis.

For the same four weeks the receipts at Atlantic ports for five years have been:

	1878.	1879.	1880.	1881.	1882.
New York.....	5,184,731	4,332,084	5,298,176	3,345,488	3,691,240
Boston.....	875,065	632,022	1,579,933	1,004,111	1,060,691
Portland.....	282,049	135,500	531,165	208,912	275,314
Montreal.....	11,054	25,890	55,614	65,632	48,379
Phila.....	2,495,115	2,306,250	1,680,210	1,081,800	829,712
Baltimore.....	2,120,100	2,755,000	2,685,883	1,797,350	593,450
New Orleans.....	1,251,027	283,058	2,306,546	1,022,983	171,110
Total.....	12,220,338	10,469,804	14,137,527	9,126,256	6,660,926

The total Atlantic receipts this year were thus 27 per cent. less than last year (when they were greatly reduced by the snow blockade), 53 per cent. less than in 1880, 36 per cent. less than in 1879, and 45 per cent. less than in 1878.

The receipts at New York are a little larger this year than last, but smaller than in any previous year of the five; Boston's receipts are much smaller than in 1881 and 1880, but larger than in previous years; Philadelphia's receipts are smaller than in any other year, and Baltimore's very much smaller—but a third of what they were in 1881, and not a quarter of its receipts in 1880 and 1879.

It should be remarked the exports are very light this year, and that the receipts for domestic consumption are much less at Baltimore than at Philadelphia, New York or Boston. The receipts at New Orleans are a mere trifle this year.

The percentage of the total receipts at each port has been:

	1878.	1879.	1880.	1881.	1882.
New York.....	42.4	41.4	37.5	36.7	55.4
Boston.....	7.2	6.0	11.2	17.6	15.9
Portland.....	2.3	1.3	3.7	2.3	4.1
Montreal.....	0.1	0.3	0.4	0.7	0.7
Philadelphia.....	20.4	22.0	11.9	11.8	12.4
Baltimore.....	17.4	26.3	19.0	19.7	8.9
New Orleans.....	10.2	2.7	16.3	11.2	2.6
Total.....	100.0	100.0	100.0	100.0	100.0

New York, Portland and Philadelphia gain in percentage, but nearly all the gain is at New York.

Comparing New York and Boston together, with Philadelphia and Baltimore together, we have:

	1878.	1879.	1880.	1881.	1882.
New York and Boston.....	49.6	47.4	48.7	54.3	71.3
Phila. and Baltimore.....	37.8	48.3	30.9	31.6	21.3
The four.....	87.4	95.7	79.6	85.9	92.6

The two northern cities thus have a very much larger proportion of the grain this year than ever before. In 1879 they received not quite so much as Philadelphia and Baltimore; this year, more than three times as much. This is due, however, not to unusually large receipts at New York and Boston, but to unusually small ones at Philadelphia and Baltimore.



## The Supply of Pine Lumber.

The pine supply of the country has been the subject of a special investigation by the Census Bureau (Mr. C. S. Sargent being the special agent in charge), which has great interest for many of the carriers. The whole Northwest and most of the East now get their pine lumber from Michigan, Wisconsin and Minnesota; and the demand from the timberless Northwest—the states west of Indiana and north of Arkansas, as far as the Rocky Mountains—is immense. The area of pine forests was always quite limited—about two-thirds of the lower peninsula and three-fourths of the upper peninsula of Michigan, one-half of Wisconsin and one-third of Minnesota. The "forestry bulletins" issued by the Census Bureau have maps showing the situation of the standing and of the cut pine, and of the forests which are now largely destroyed, each separately. From these it appears that at least four-fifths of the pine forests in the lower peninsula of Michigan are cut or largely destroyed; and one-third in the upper peninsula, and about half of the Wisconsin and Minnesota pine. The standing forests of Michigan are now chiefly north of the latitude of Saginaw Bay, with a broad belt along Lake Michigan and the northwest shore of Saginaw Bay where the pine is "largely destroyed." In Wisconsin the brown tint showing cut pine extends far to the west of Lake Michigan and Green Bay, and for a considerable distance east of the St. Croix River, and forms broad veins along the streams and the Wisconsin Central Railroad further north. The green tint of standing pine reaches but little below an east and west line through Green Bay and Stevens' Point. In Minnesota little is left south of the line of the Northern Pacific Railroad, and most of it is at present inaccessible. In these three states Mr. Sargent estimates that there was at the end of May, 1880, pine enough uncut to make 82,100 millions of feet of merchantable lumber, while during the year preceding 7,035 millions of feet had been cut. At this rate (and during the following year the quantity cut was much greater) it will take but 11½ years to exhaust the whole supply of merchantable pine in these three states, which is substantially the sole dependence of the whole prairie country. But the pine forest that remains to be cut is of course more inaccessible than that which has been cut, and much of it (chiefly in Minnesota) cannot be reached at all by the present lumber-carrying railroads. According to these bulletins, the lower peninsula of Michigan had a supply for only 7½ years a year ago last June. The amount standing (in millions of feet), the amount cut in the year ending with May, 1880, and the time within which at that rate all the pine will be cut are as follows:

	Standing.	Cut in 1879-80.	Years' supply.
Michigan, lower peninsula....	29,000	4,069	7.13
upper peninsula....	6,000	228	18.30
Wisconsin.....	41,000	2,097	19.52
Minnesota.....	6,100	541	11.27
Total.....	82,100	7,035	11.67

Wisconsin appears to have half of the whole stock of standing pine, and with it should be counted the upper peninsula of Michigan, whose pine belongs to the same forest and will be largely marketed by the same carriers. It is not probable that much of the pine left in Wisconsin will be marketed by way of Milwaukee, Chicago or any other lake cities, as it is nearer the trans-Mississippi country where it stands, and can reach it by shorter rail hauls than those from Chicago. Much more is this true of the Minnesota pine. It would seem, then, that the vast Chicago lumber trade must dwindle—at least that part of it which supplies the far West. The railroads in northern Wisconsin, it would seem, must have an increasing share of the lumber freight, as the Michigan supply dwindles, and is required in the East, unless imports from Canada increase greatly.

But if the estimates in these bulletins can be depended upon, the whole traffic is but a temporary one, and the important thing for the carriers and the country will be to know what the treeless West will do without lumber. It appears from them that there is not now more than ten year's supply, even if the last merchantable tree be cut.

It is difficult to believe that we are threatened with the annihilation of our lumber supply so soon, because, unless the reported facts are universally ignored by the owners of pine lands and the lumbermen, the very short supply should have caused an immense advance in prices, while, in fact, we believe prices are not much higher than ten years ago, though a great deal higher than they were five years ago. But in the case of lumber, as of coal and some other natural products, it is the present supply that has most effect on prices. The prospect of getting double or even treble prices for my trees or coal ten years from now does not prevent me from selling now. But if there is really but ten years supply of pine in the states named, then there must be a short supply very soon.

The Census Bureau has also issued forestry bulletins for Florida, Alabama, Mississippi and Texas—the long-leaved and yellow pine belt. The aggregate standing in these states it estimates to be sufficient for 119,290 millions of feet of merchantable lumber, and it is not cut nearly so fast as the Northwestern pine. Considerably more than half of this (67,508 millions) is in the state of Texas, which yet has pine only along its eastern border for about 100 miles west of the Louisiana line—nearly all east of the Houston & Great Northern Railway. From this forest west the state extends about 600 miles, not only without pine, but with very little other timber. Comparatively a small area of the pine forests of Texas has been cut. In this state the pines are of three kinds, of about equal area—the long-leaved pine along the Sabine River, extending nearly as far west as Trinity, half-way to Houston and about half-way to the north line of the state, wholly north of the Texas & New Orleans

Railroad, however, south of which the map shows no pine. Within the same limits, north and south, extending from the long-leaved pine forest west some sixty miles, a little west of Houston on the south, and Palestine on the north, is the "loblolly pine." In the northwestern part of the state is the true yellow pine, with which the long-leaved pine is often confounded in the North, and which grows in most of the Southern states further from the sea than the long-leaved pine, and in much of the country is too small to afford lumber. (It is this pine that covers the abandoned tobacco and cotton fields, where trees a hundred years old are rarely a foot in diameter). The census bulletins credit Mississippi with 29,975 millions of feet; Alabama with 21,192 and Florida with 6,615. There is a considerable amount in Louisiana and Georgia also, for which bulletins are not yet issued.

The Southern pine is not an acceptable substitute for the Northern white pine for many purposes, as may be known by the fact that the latter is shipped in considerable quantities to the South, for inside work of houses especially; but it is already extensively used on the Northern sea-board for framing, etc., and of course lessens the demand for white pine and hardwood there. Its distance from the Northwest will prevent its use there to a large extent. There is, however, a considerable amount of pine in northeastern Arkansas and the part of Missouri adjacent, which already reaches the St. Louis market in considerable quantities. The demand for pine in the South is never likely to be what it is in the Northwest; not only because the South has few towns and cities, but especially because it is nearly all (except the greater part of Texas) a wooded country, and supplies for framing and fencing, and a large part of what is needed for houses, can be had near by; if not of pine, of some available timber. This is to a certain extent true of the North east of Illinois, though there the denser population has caused the destruction of the forests to a much greater extent. Still, within a short distance of New York even, new rail fences may be seen, and in most of this district probably the fencing is nearly all supplied by local forests, and a large part of the other lumber and timber.

In Texas there is a prospect of a large lumber traffic, because the broad belt of agricultural land west of the pine woods is insufficiently wooded—at least the western part of this belt is. But we must not assume that the whole of the vast area west of the pine woods will require lumber as the Northwestern prairies require it. By far the larger part is more like the plains of Western Kansas, Nebraska and Colorado than like the prairies of Illinois and Iowa, and will be a grazing and not an agricultural country; and as such will be very thinly peopled and have very few fences. Texas is probably much better supplied with timber than the Northwest, and its pine forests in the east will long afford a large traffic to its east and west railroads.

One of the peculiarities of the purely pine forests, north and south, but especially north, is that the cleared ground has little value for any purpose. When a forest of deciduous trees is cleared away, it usually gives place to productive farms; but when the lumber is cut from a pine forest, little remains to support population or afford traffic. Railroads through such forests may carry an enormous traffic for a few years, and then have little to do. This is the case along the South Atlantic coast, where, the lumber being cut and the turpentine orchards exhausted, nothing takes the place of these products. The railroads usually have been located in river valleys and where there was most cultivable land, and have not depended greatly on the forest products in most cases; but where there is a long stretch of road through pine woods, a falling-off of the traffic in that line is almost certain at some time. But where the pine is interspersed with a large proportion of deciduous trees, there is often very fair farming land, and in the South often the very best cotton land, as in Southwestern Georgia, about Albany. The census bulletin maps indicate that nearly the whole pine country of the lower peninsula of Michigan is so mixed with deciduous trees (but not the proportion of pine, on which a great deal depends), also more than half the pine forests of Wisconsin, and most of the cut-pine district in Minnesota. And we know that there has been a very large growth of population in the pine counties of the lower peninsula of Michigan, and of agricultural production on such roads as the Flint & Pere Marquette and the Grand Rapids & Indiana. And the slowness of growth of the cleared pine districts heretofore has doubtless been largely due to the abundance and cheapness of fertile prairie lands further west, which can be brought under cultivation much more easily than a wilderness of stumps and saplings. But this supply of cheap prairie land has now become comparatively small, and is far distant from market; and as it grows smaller there is sure to be much more of the less fertile land, now unused, brought under cultivation in the older states, much to the advantage of the carriers in forest countries in which the merchantable trees have been mostly cut.

## Record of New Railroad Construction.

This number of the Railroad Gazette contains information of the laying of track on new railroads as follows:

*East Tennessee, Virginia & Georgia.*—This company's Macon & Brunswick line is extended from Macon, Ga., northwest to Holston, 9 miles. Gauge, 5 ft.

*Grand Rapids & Indiana.*—Extended from Petokey, Mich., to Harbor Springs, 8 miles. Part of this track was laid last year.

*Indiana, Bloomington & Western.*—Track laid on the Eastern Extension from Springfield, O., west to Troy, 25 miles.

*Ontonagon & Brule River.*—Track laid to a point twenty miles east of Ontonagon, Mich., an extension of 12 miles.

This is a total of 54 miles of new railroad, making 192 miles thus far reported for 1882, against 110 miles reported at the corresponding time last year.

CHICAGO SHIPMENTS EASTWARD for the week ending Jan. 28 were 80,525 tons, which is nearly 3,000 tons more than the week before, very nearly as large as the largest of 1881 (the first week of the railroad war), and exceeded in but one week of 1880. For three successive years the shipments of this fourth week of January and of the four weeks then ending have been:

	1880.	1881.	1882.
Week to Jan. 28.....	41,775	65,870	80,525
Four weeks to Jan. 28.....	149,838	253,200	284,117

For the week the shipments this year were 22¼ per cent. more than in 1881 and 93 per cent. more than in 1880. For the four weeks the shipments this year were 12¼ per cent. more than in 1881 and 91 per cent. more than in 1880. The only time when there have been as large a month's shipments was in March, 1880.

Of the shipments for the week ending Jan. 28, 1882, 10.2 per cent. was by the Chicago & Grand Trunk, 24.6 per cent. by the Michigan Central, 29.8 by the Lake Shore, 19.5 by the Fort Wayne, 12.1 by the Pan-handle, and 3.8 per cent. by the Baltimore & Ohio. The two Vanderbilt roads have 54.4 per cent. of the whole, against 49 in the late pool, and the two Pennsylvania roads 31.6, against 33 in the pool.

For the week ending Feb. 4 the Chicago Board of Trade reports the shipments billed from Chicago to have been 72,110 tons, against 66,296 the week before and 51,170 in the corresponding week of last year. These are the largest shipments ever made from Chicago in a single week, probably. The shipments have increased regularly now every week since December. Of the shipments last week 9,118 tons were flour and 49,276 grain. The provision shipments were smaller than in previous weeks.

The two Vanderbilt roads carried 56¼ per cent. of the flour and grain and 40 per cent. of the provisions; the two Pennsylvania roads 25.3 per cent. of the flour and grain and 50.9 per cent. of the provisions. The Pan-handle again has a large proportion of the flour (23 per cent.), and its total freight is nearly as much as the Fort Wayne's.

In the week before the total shipments east from Chicago (including through shipments from points beyond passing through Chicago) were 14,229 tons more than the shipments originating at Chicago, which alone are reported by the Board of Trade. If there was the same difference in the week ending Feb. 4 (which we shall not know till next week) then the shipments that week were larger than ever before by rail in any year.

We have nothing to add to the explanations of this extraordinary movement which we have given before. It is not an abnormal movement, and it cannot possibly be maintained. At such rates as were received last year it would make the roads carrying it unusually prosperous. At the rates actually received it probably did not pay the cost of carrying, and it would have been at least as well for the railroads if it had been held till spring and then shipped by lake. It was hoped that the shipments on low contract rates would be completed by the end of January; but as the shipments this month continue extraordinarily large, it is not likely that this is the case. When the contracts have been filled we may expect a great and sudden falling off of shipments.

CENTRAL PACIFIC FREIGHT TRAFFIC has been reported for 1881, showing an increase of 30,274 tons (10.8 per cent.) in the amount carried through, and of 429,582 tons, or 30 per cent., in the tons of local freight. The freight traffic of this road has made good progress of late years, though, considering the large addition of mileage (in the leased Southern Pacific road), the gain is less than on many other roads. For six successive years the tons of freight carried have been:

	Through east.	Through west.	Total through.	Local.
1876.....	188,774	925,311		
1877.....	173,240	971,078		
1878.....	180,072	1,300,873		
1879.....	85,103	134,581	219,684	1,270,871
1880.....	113,795	165,425	279,220	1,431,110
1881.....	131,991	177,593	309,584	1,800,692

In view of the new lines to the Pacific just opened and under construction, the amount and growth of the through freight are especially interesting. The growth, we see, has been wholly since 1878. From 1878 to 1879 it increased 22 per cent.; from 1879 to 1880, 27 per cent.; from 1880 to 1881, 10½ per cent. During more than half of last year the company worked two through lines; but the increase was then less than in either of the two previous years.

The number of tons of local freight is six times as great as the number of through freight, but there is nothing like that difference in the business afforded by the two—the ton-miles. Most of the local freight is carried between stations in California, and the average haul on it was but 185.7 miles in 1880, against 820.5 in through freight, and the ton-miles of the latter were then but a seventh less than those of local freight. The wheat crop of California alone in 1880 was much more than a million of tons, and most of it must have at some time been moved by the Central Pacific Railroad.

The through freight last year was equivalent to an average of 567 tons daily westward and 422 eastward, and could be carried in two trains of 30 cars each with the old ten-ton loads. Compared with the traffic of many other roads it is but a trifle. The through shipments eastward from Chicago during the month of January last were greater than the through shipments in both directions over the Central Pacific Railroad for the whole year 1881.

RAILROAD COMMISSION BILLS are the order of the day at Albany, and if the Assembly succeeds in organizing we



suppose there is no doubt that one will pass, and for ourselves we say frankly that New York ought to have a railroad commission. But then there are railroad commissions and railroad commissions. Some of the bills proposed at Albany are rank communism. What is known as the Boyd bill takes the whole power of making rates from the owners of the railroads and gives it to the agents of the customers of the railroads. In all the minutely restrictive laws of continental Europe there has never been anything approximating the power which the Boyd bill would give a railroad commission in New York, and it is a power which no government can properly exert without first buying the railroads. There is as much difference between such a commission and the Massachusetts or Iowa commissions as between the government of England and that of Turkey. In England, where no one questions the power of Parliament to pass laws of any kind, any "regulation" like that proposed in the Boyd bill would be regarded as equivalent to confiscation, and we do not remember that even the wildest agitators there ever proposed anything of the kind. It is not at all certain that New York will have a good railroad commission, even if it gets a good railroad commission law. Routine is of little worth in such an office, but special knowledge, first rate ability, and a good grounding in economical and commercial principles are required, and they are not likely to be found ready made, but in large part will have to be developed in the office itself. A commissioner, unless such a man as is very unlikely to get the place, will not be worth much until he has held office four or five years; but before that time in New York he would probably have to give way to some one else.

BESSEMER STEEL PRODUCTION in this country goes on increasing at a wonderful rate. Mr. Swank, the Secretary of the Iron and Steel Association, has collected complete returns from all the works for 1881, showing a production of steel ingots that year of 1,374,247 tons of 2,240 lbs., which is 28 per cent. more than the great production of 1880, 66 per cent. more than in 1879, and 110 per cent. more than in 1878. From the beginning there has been no interruption to the rapid growth of this important manufacture, and the production in 1881 was four times that of 1875 and eight times that of 1874. Mr. Swank's report (published on another page) gives a very interesting statement of all the works now in operation or under construction, with the converter capacity of each. From this it appears that the works in operation in 1881 had an aggregate converter capacity of 200 tons, though not all of this was completed at the beginning of the year. Already this year an additional 10-ton converter has been completed, and six other converters with an aggregate capacity of 38 tons are so nearly completed that they will probably be turning out steel within a few months. We shall then have 248 tons of converter capacity, which should be able to turn out about one-fourth more than the plant in operation last year.

The Bessemer works last year rolled 1,118,865 tons of steel rails. Besides this a considerable quantity of steel rails was rolled from imported blooms by iron rolling mills—estimated at 88,000 tons, which would make the total production of steel rails about 1,200,000 tons, as estimated by Mr. Swank some weeks ago.

THE ADVISORY COMMISSION which is to hear testimony with regard to the differences of rates to sea-board ports and make recommendations concerning the maintenance, change or abolition of such differences, is now announced, all the members having accepted their appointments. They are Hon. Thomas M. Cooley, of the Supreme Court of Michigan, for more than twenty years a Professor in the Law School of the University of Michigan, and an eminent writer on constitutional law, etc.—a man of the very highest character and of first-rate ability, who is certainly the equal of his better-known associates on the commission; Hon. E. B. Washburne, of Illinois, late Minister to France, and a member of Congress or elsewhere in public life during a long life-time, and brother, by the way, of the President of the Minneapolis & St. Louis Railroad, Hon. C. C. Washburne; and, finally, of Hon. Allen T. Thurman, fully as well known as Mr. Washburne, but with a great reputation as a lawyer as well as a statesman, and, like the other members, a man of high character. These gentlemen, perhaps, are not particularly well informed in commercial affairs and transportation business; but they are selected as men of eminently judicial minds, and members of communities which are comparatively indifferent as to the terms of the settlement of the question at issue.

THE FAST CHICAGO TRAIN is still run on the Pennsylvania Railroad, and is not withdrawn as some supposed it would be on the settlement of the railroad war. The fare is \$5 more than by other trains with the same accommodations. That is, the passenger by the fast train, besides the regular fare of \$20 (by all trains), pays \$10 for an "extra fare" ticket, which entitles him to a sleeping-car berth, which on other trains costs \$5. This is a moderate addition for a fast train for more than 900 miles, but there has been very general incredulity as to the possibility of commanding traffic enough at such higher rates to make the train pay. But the company has now run the train several months, during which its rates were more than \$5 greater than those by other routes, and it is evidently convinced that the experiment is at least worth a longer trial. The other roads do not like to have such a train run, but doubtless it was allowed in settling the passenger troubles, and may have been one of the "considerations" which led the Pennsylvania to

withdraw from its position as to prices of New England tickets via New York.

Tickets by this train are sold to and from Boston, New York, Philadelphia, Baltimore, Washington, Harrisburg, Pittsburgh, Alliance, Crestline, Fort Wayne and Chicago. To Pittsburgh the "extra fare" is \$5 from New York and Philadelphia, and \$4 from Baltimore and Washington.

EXTORTION is charged against the railroads by sundry citizens of Illinois. Their call for the Illinois state convention to enforce the railroad law says that the railroads are shouldering on the citizens of the state an indirect burden of taxation amounting to \$100 to \$300 per capita. Illinois has considerably more than 3,000,000 inhabitants. This tax at the lowest rate would amount to \$300,000,000 a year, at the highest to \$900,000,000. Now in the last year reported the gross earnings of the railroads in Illinois were but \$41,000,000, and their net earnings about \$17,000,000, and the net earnings of all the railroads of the United States were but \$255,000,000. These gentlemen therefore are somewhat mistaken in their calculation of the "burden of taxation" imposed by the railroads on the people of Illinois. The amount paid per capita in the whole United States for railroad profits—for interest on the cost of the railroads—was just about \$5 in 1880, and not "from \$100 to \$300." By far the larger part of this \$5 went for interest on the companies' bonds, and the dividend payments of the year were about \$1.53 per inhabitant—an amount worth saving, certainly, but not justifying such desperate measures as if it were \$100 or more.

ENGLISH-AMERICAN LOCOMOTIVES are to be used on the Canadian Pacific. Mr. Kenneth Blackwell, the Superintendent of Motive Power, has recently returned from Europe, where he went to arrange the details of a contract for 25 engines for that road, to be built by Messrs. Dubs & Co., of Glasgow. The engines are copies of Baldwin's in design. They are to be of the American type, with 17 x 24 in. cylinders and 5 ft. 6 in. wheels. The only departures from American practice will be in the boilers, which are to be made of  $\frac{1}{2}$  in. plates with butt-joints quadruple-riveted in the longitudinal seams. The fire-boxes are to be made of steel manufactured by a Scotch firm. Mr. Blackwell took with him samples of Otis steel to which that made by the firm referred to must conform both in chemical composition and endurance of mechanical tests. The driving wheels are to be of wrought iron. As Mr. Blackwell says, they are to be American engines with English boilers.

THE GROWTH OF THE RAILROAD SYSTEM is well illustrated by the fact that within the six months ending with January last the names of between 1,800 and 2,000 new stations have been added to the index of railroad stations in the *Official Railway Guide*. It is not probable that all these stations were first opened within that period, though most of them must have been.

THE QUESTION OF A UNIFORM STANDARD OF TIME was brought before the General Time Convention last fall, and by it was referred to its Secretary, Mr. W. F. Allen, who is to report at the meeting next April. Persons interested in the subject who have any recommendations or suggestions to make are requested to communicate with Mr. Allen, whose address is No. 46 Bond street, New York.

## General Railroad News.

### MEETINGS AND ANNOUNCEMENTS.

#### Meetings.

Meetings will be held as follows:  
*Delaware, Lackawanna & Western*, annual meeting, at the office in New York, Feb. 21.  
*Indiana, Bloomington & Western*, annual meeting, at the office in Indianapolis, Ind., Feb. 23.  
*Missouri Pacific*, annual meeting, at the office in St. Louis, March 7.  
*Ohio & Mississippi*, special meeting, at Flora, Ill., April 6.  
*Union Pacific*, annual meeting, at the office in New York, March 8.  
*Wabash, St. Louis & Pacific*, annual meeting, at the office in St. Louis, March 14.

#### Railroad Conventions.

A *Ticket Commission* meeting will be held at the Grand Pacific Hotel, Chicago, Feb. 15, at 11 a. m. All general passenger and ticket agents are invited to attend.  
A meeting of *General Baggage Agents* of the roads in the United States has been called to be held at Louisville, Feb. 22. The object of the meeting is to make the temporary Association of General Baggage Agents formed at St. Louis last November permanent.

#### Dividends.

Dividends have been declared as follows:  
*New York, Providence & Boston*, 2 per cent. quarterly, payable Feb. 10.  
*Detroit, Lansing & Northern*, 3½ per cent., semi-annual, on preferred stock, payable Feb. 15.  
*Cleveland & Pittsburgh* (leased to Pennsylvania Company), 1½ per cent., quarterly, payable March 1.

#### Enforcing the Illinois Railroad Law.

A call has been issued for a state convention to be held in Springfield, Ill., March 15, to form an organization with a committee in every county, "to detect, report and prosecute every violation of the law by corporations, and to adopt such measures as shall insure justice being done the people by the agents of the law who have its enforcement in hand." The complaint is against the state railroad commissioners as well as against the railroads. Of the latter, however, it is said that they are fixing their own rates regardless of legal provisions, except when their interests are fully served by a schedule of rates which in many respect is unjust to the shippers, and must be revised; that they have been and are discriminating against individuals, communities and industries; that they

have been and are evading taxation, and by such and various other ways shouldering upon our citizens an indirect burden of taxation which annually amounts to from \$100 to \$300 per capita.

The leading names signed to call are those of well-known anti-railroad agitators.

#### Ticket Commission Meeting.

The following circular has been issued by Mr. W. H. Dixon, Chairman of the December meeting on the ticket commission question:

"There will be a meeting of general passenger and ticket agents at the Grand Pacific Hotel, in this city (Chicago), on Wednesday, Feb. 15, at 11 o'clock a. m., for the purpose of further considering the above question. At the meeting of Dec. 15 and 16, 1881, an agreement was entered into (a copy of which has been furnished you), whereby parties thereto bound themselves to prohibit their agents from receiving commissions, and to protect each other against any discrimination attempted on account of this action. The following companies are now parties to said agreement:

Alabama Great Southern.  
Burlington & Missouri River in Nebraska, and Leased Lines.  
Cairo & St. Louis.  
Camden & Atlantic.  
Charleston & Savannah.  
Chicago, Burlington & Quincy.  
Chicago & Iowa.  
Chicago, Milwaukee & St. Paul.  
Chicago & Northwestern.  
Cincinnati, Indianapolis, St. Louis & Chicago.  
Cincinnati, New Orleans & Texas Pacific.  
Cincinnati, Washash & Michigan.  
Cleveland, Akron & Columbus.  
Cleveland, Columbus, Cincinnati & Indianapolis.  
Columbus, Hocking Valley & Toledo.  
Des Moines & Fort Dodge.  
East Tennessee, Virginia & Georgia.  
Georgia.  
Georgia Central.  
Grand Rapids & Indiana.  
Green Bay, Winona & St. Paul.  
Houson & Texas Central.  
Illinois Central.  
Illinois Midland.  
Jeffersonville, Madison & Indianapolis.  
Lake Shore & Michigan Southern.  
Lehigh Valley.  
Little Rock & Fort Smith.  
Louisville & Nashville.  
Memphis & Little Rock.  
Michigan Central.  
Missouri Pacific, Leased and Operated Lines.  
Pennsylvania Company.  
Pennsylvania Railroad.  
Pittsburgh, Cincinnati & St. Louis.  
St. Louis, Alton & Terre Haute.  
Terre Haute & Indianapolis.  
Texas Pacific.  
Union Pacific.  
Wabash, St. Louis & Pacific.  
Western & Atlantic.

"You are respectfully invited and earnestly requested to attend the meeting on Feb. 15, and give the movement your support by becoming a party to the agreement, if you have not already done so. It is thought that arrangements will be made at said meeting whereby the movement will prove a triumphant success."

### ELECTIONS AND APPOINTMENTS.

*Atchison, Topeka & Santa Fe*.—Mr. Albert Nickerson has been chosen a director in place of S. L. Thorndike, resigned.

*Bodie & Benton*.—The directors of this new company are: R. N. Graves, J. B. Low, Thomas Menzies, A. J. Halston, Wm. Willis, W. S. Wood, H. M. Yerrington. Office in San Francisco.

*Boston & Albany*.—The Legislature of Massachusetts on Feb. 7 elected the following state directors in this company, to serve two years: Jarvis N. Dunham, Pittsfield; Joseph H. Chadwick, Hyde Park; M. D. Spaulding, Boston. Messrs. Dunham and Chadwick are re-elected; Mr. Spaulding succeeds John Kinsman, of Salem.

At the annual meeting in Boston, Feb. 8, the following directors were chosen by the stockholders: Henry Colt, Pittsfield, Mass.; E. B. Gillett, Westfield, Mass.; Wm. Bliss, James A. Rumrill, Springfield, Mass.; John Cummings, Woburn, Mass.; Charles S. Sargent, Brookline, Mass.; George O. Crocker, New Bedford, Mass.; Moses Kimball, Boston.

*Central, of Georgia*.—The board has elected Mr. E. C. Anderson, of Savannah, Ga., President in place of Wm. M. Wadley, resigned.

*Chicago & Eastern Illinois*.—The President, Mr. F. H. Story, has issued the following circular: "At a meeting of the board of directors of this company, held on the 30th ult., Mr. D. J. Mackey was elected Vice-President, and, as such officer, is vested with full power and control in the management of the property."

*Chicago, St. Louis & New Orleans*.—The office of Assistant General Manager L. T. Brien has been removed from Jackson, Tenn., to New Orleans.

Mr. C. M. Sheafe has been appointed General Superintendent (a new office) with headquarters in New Orleans.

Mr. E. D. Anderson is appointed Acting Superintendent of the Southern Division in place of W. P. McKinley.

Mr. A. S. Graham is appointed General Traveling Passenger Agent, with headquarters in New Orleans.

Mr. Sheafe was at one time Superintendent of Transportation of the Missouri, Kansas & Texas road.

*Cleveland, Akron & Columbus*.—Mr. E. F. Affleck has been appointed General Freight and Ticket Agent, and will have his office in Columbus, Ohio.

*Columbus & Xenia*.—This company has elected J. R. Swan President; R. S. Smith, Secretary and Treasurer. The road is leased to the Pittsburgh, Cincinnati & St. Louis.

*Commissioner of Railroad Accounts*.—The President has nominated for Commissioner of Railroad Accounts in the Interior Department Mr. Wm. H. Armstrong, of Williamsport, Pa. Mr. Armstrong was formerly a member of Congress from Pennsylvania.

*Danbury & Norwalk*.—Mr. Charles E. St. John has been chosen a director in place of D. P. Nichols, deceased.

*Detroit, Lansing & Northern*.—Mr. J. R. Wood has been appointed Traveling Passenger Agent. He was recently Agent in Detroit for the Michigan Central.

*Erie & North Shore Dispatch*.—Mr. Peter Young is appointed Michigan Agent in place of David E. Barry, who



has gone to the Canada Southern. Mr. Edward Wilde succeeds Mr. Young as Agent at Detroit.

**Fall River.**—At the annual meeting, Jan. 27, the following directors were chosen: F. L. Ames, J. A. Beauvais, H. A. Blood, John S. Brayton, Charles F. Choate, George Marston, Morgan Rotch, W. J. Rotch, Royal W. Turner. Office at Fall River, Mass.

**Fl. Wayne & Jackson.**—At the annual meeting recently, the following directors were chosen: Wm. E. Dodge, E. O. Grosvenor, Wm. H. Hays, James F. Joy, Percy R. Payne, R. G. Rolston, Samuel Sloan, Moses Taylor.

**Galveston, Houston & Henderson.**—At the annual meeting in Galveston, Tex., Jan. 27, the following directors were chosen: H. B. Andrews, J. A. Baker, B. A. Bates, John C. Brown, W. S. Harding, R. S. Hayes, H. M. Hoxie, J. H. Hutchings, Allen McCoy. The board elected W. S. Harding President; Allen McCoy, Vice-President; C. G. Clifford, Secretary and Treasurer.

**Huntingdon & Broad Top Mountain.**—At the annual meeting in Philadelphia, Feb. 7, the following were chosen: President, B. Andrews Knight; directors, Rathmell Wilson, John Devereux, I. V. Williamson, James Long, James Whitaker, Joseph H. Trotter, William P. Jenks, C. W. Wharton, Samuel Field, Thomas R. Patton, Jacob Naylor, Spencer M. Janney.

**Illinois Central.**—Mr. H. A. Winter has been appointed General Baggage Agent, with office in Chicago. He has been acting in that capacity for some time.

**Kansas Central.**—Mr. Wm. T. Kelly has been appointed Superintendent, with office in Leavenworth, Kan. He has been on the Union Pacific for a long time.

**Kentucky Central.**—The new board has elected officers as follows: President, M. E. Ingalls; Vice-President, John Echols; General Counsel, J. W. Stevenson; Secretary and Treasurer, C. H. Bronson; General Manager, J. D. Ellison; General Passenger and Freight Agent, C. L. Brown; Superintendent of Transportation and Motive Power, J. H. Setchel; Chief Engineer of existing road, A. R. Ledyard; Chief Engineer of Construction, new line, M. L. Lum.

**Lehigh Valley.**—Mr. John Taylor, heretofore General Freight Agent, will be hereafter General Traffic Manager of this road and its leased and controlled lines.

**Little Miami.**—At the annual meeting recently, the following directors were chosen: Louis Ballauf, A. D. Bullock, C. P. Cassidy, W. H. Clement, Julius Dexter, Henry Hanna, L. B. Harrison, Hugh J. Jewett, J. Longworth, Thomas D. Mesler, J. H. Rogers, J. R. Swan. The road is leased to the Pittsburgh, Cincinnati & St. Louis.

**Lovell & Framingham.**—At the annual meeting in South Framingham, Mass., Feb. 2, the following directors were chosen: S. N. Aldrich, C. B. Bigelow, H. A. Blood, W. O. Brown, James W. Clark, John Fletcher, R. D. Harding, J. R. Kendrick, C. H. Latham, Jacob Nichols, S. B. Rogers, Nathaniel Thayer, Jr., Daniel Wetherbee. The road is leased to the Old Colony Company.

**Milford & Woonsocket.**—This company has elected Geo. Draper President; C. F. Claffin, Clerk and Treasurer. The road is leased to the Providence & Worcester Company.

**New Brunswick.**—The officers are now as follows: President, Samuel Thorne; Vice-President, Isaac Burpee; Superintendent and Engineer, E. R. Burpee; Treasurer and Assistant Superintendent, Alfred Seely.

**New London Northern.**—At the annual meeting, Feb. 1, the following directors were chosen: Wm. W. Billings, Wm. H. Barnes, Augustus Brandegee, Robert Coit, J. N. Harris, Benjamin Stark, New London, Conn.; C. H. Osgood, Norwich, Conn.; Thomas Ramsdell, Windham, Conn.; James A. Rumrill, Springfield, Mass.; W. F. Hill, Boston; Wm. Allen Butler, New York. The board elected Robert Coit President and Treasurer; J. A. Southard, Secretary.

**New York, Chicago & St. Louis.**—At a meeting of the board held Feb. 6 the directors were divided in three classes, whose terms are one, two and three years respectively, as follows: One year, C. R. Cummings, E. H. R. Lyman, J. T. Martin, George R. Seney, C. S. Brice; two years, A. M. White, Samuel Thomas, Nelson Robinson, W. H. Brown; three years, D. P. Eells, Wm. Fleming, Chas. Foster.

The election of officers resulted as follows: President, C. R. Cummings; Vice-President, C. S. Brice; Secretary, B. G. Mitchell; General Manager, Lewis Williams; Chief Engineer, I. A. Lather.

**New York & Norfolk.**—The officers of this company are: President, Wm. Painter; Treasurer, James D. Kase; Superintendent, U. H. Painter; General Freight and Ticket Agent, John L. Bates; Chief Engineer, E. W. Goerke. Offices at Pocomoke City, Md.

**Northern Central.**—John Scott has been appointed General Solicitor and James A. Logan Assistant General Solicitor. Offices in Philadelphia.

**Norfolk & Western.**—Mr. Charles Blackwell has been appointed Superintendent of Motive Power, with office at Roanoke, Va. He has been for some time on the Midland Railway of Canada.

**Ohio Central.**—The directors of this company as consolidated are: Calvin S. Brice, Lima, O.; Daniel P. Eels, Cleveland, O.; Thomas Ewing, Lancaster, O.; Samuel F. Thomas, Columbus, O.; Joseph S. Miller, Wheeling, W. Va.; Henry C. Parsons, Charles E. Northam, Richmond, Va.; Wm. H. Barnum, Lime Rock, Conn.; Joseph H. Gray, Boston; Francis O. French, George I. Seney, Samuel Shethar, George F. Stone, New York.

**Pennsylvania Company.**—Mr. Charles O. Scull is appointed Chief Assistant General Passenger Agent in place of Henry Monett, resigned. Mr. Frank Van Dusen is appointed Chief Clerk.

**Pittsburgh, Cincinnati & St. Louis.**—Mr. Charles O. Scull is appointed Chief Assistant General Passenger Agent, in place of Henry Monett, resigned.

**Pittsburgh & North Adams.**—At the annual meeting in Boston, Feb. 8, the following directors were chosen: Chester W. Chapin, Henry Colt, Edward Jackson, F. H. Appleton, Ignatius Sargent, Jr. The road is leased to the Boston & Albany.

**Pittsburgh & Western.**—General Manager E. K. Hyndman announces the officers of this road as follows: H. A. Schwanecke, Pittsburgh, Chief Engineer, in charge of construction; W. C. Mobley, Pittsburgh, General Agent, in charge of right of way; J. L. Kirk, Pittsburgh, Auditor and Acting General Freight and Ticket Agent; C. P. Ford, Pittsburgh, Chief Clerk of General Manager, Acting General Passenger Agent, will also perform the duties of Paymaster and Purchasing Agent; W. F. Hoffecker, Zelienople, Master Mechanic; L. E. Tennant, Zelienople, Trackmaster; W. M. Hawkins, Allegheny, Train-Master, Pittsburgh Division. Mr. W. J. Bonner having resigned to en-

gage in private business, the office of Superintendent is abolished.

**Providence & Worcester.**—At the annual meeting in Providence, Feb. 6, the following directors were chosen: George A. Leete, William S. Slater, Moses B. I. Goddard, Amos D. Lockwood, Frederick Grinnell, Josiah La ell, Providence, R. I.; Gideon L. Spencer, Pawtucket, R. I.; Lyman A. Cook, Oscar J. Rathbun, Woonsocket, R. I.; Paul Whitin, John C. Whitin, Whitins, Mass.; Elijah B. Stoddard, Joseph E. Davis, John Dean, Worcester, Mass.; David K. Phillips, Boston. The only new director is Mr. Lasell, who succeeds Estus Lamb.

**Richmond & Danville.**—The Richmond (Va.) State of Feb. 6 says: "Mr. Thomas W. Gentry has been appointed Master Mechanic of the shops in Manchester. Mr. Gentry entered the service of the company at eleven years of age, and has served as messenger and errand boy, clerk, telegraph operator, machinist, assistant fireman, fireman, and now has charge of the shops he entered 20 years ago in the humblest capacity."

**Richmond & Mecklenburg.**—Mr. R. H. Talcott is Chief Engineer of this road.

**Rochester & Ontario Belt.**—The directors of this new company are: D. McNaughton, Henry A. Taylor, Joseph C. Tone, Mortimer Wilkie, Rochester, N. Y.; John E. Cole, Rutherford Park, N. Y.; A. W. Burlingame, Frederick A. Wilkie, Brooklyn, N. Y.; F. A. Bassler, John R. Dillon, Jesse R. Grant, Adolph M. Klemm, Christopher Meyer, Henry N. Shoemaker, New York.

**St. Paul, Minneapolis & Manitoba.**—Mr. E. B. Wakeman is now Superintendent of Transportation of the entire line. The division superintendents are as follows: J. B. Rice, St. Paul, Fergus Falls Division; A. Gustine, St. Paul, Breckenridge Division; C. O. Wheeler, Fergus Falls, Minn., Northern Division.

General Manager Marvel, by circular dated Jan. 30, gives the following notice: "Mr. Harvey Middleton is appointed Master Mechanic of this company, vice A. A. Ackery, resigned. Appointment and resignation in effect from and after Feb. 1, 1882. In the position to which he is appointed, Mr. Middleton will have full charge of the locomotive and car departments, and reports from officers and employees, in relation to these departments, should be made to him."

**Shenandoah Valley.**—Mr. Charles Blackwell has been appointed Superintendent of Motive Power, with office at Roanoke, Va. He holds the same office on the Norfolk & Western road also.

**Texas & St. Louis.**—Mr. W. F. Maxwell has been appointed Train-Master in place of C. P. Johnson, resigned.

**Toledo & South Haven Extension.**—This company has elected John F. Wolf President; John A. McKinley, Secretary; D. D. Thomas, Treasurer.

**Trunk Lines Advisory Commission.**—The three gentlemen named as an Advisory Commission in the recent agreement between the trunk lines have all accepted, and their names are announced as follows: Judge Thomas M. Cooley, of Michigan; Ex-Senator Allen G. Thurman, of Ohio, and Hon. Elihu B. Washburne, of Illinois.

**Valley, of Ohio.**—Mr. R. D. Briggs is appointed Master of Transportation, and Mr. Thomas W. Cockerill Train Dispatcher and Superintendent of Telegraph.

**Virginia, Tennessee & Georgia Air Line.**—Mr. I. R. Westlake has been appointed New York Agent of the Virginia, Tennessee & Georgia Air Line, composed of the Shenandoah Valley, the Norfolk & Western and the East Tennessee, Virginia & Georgia roads.

**Wabash, St. Louis & Pacific.**—Mr. Herbert E. Mather is appointed Traveling Auditor, with headquarters in Peoria, Ill. He was recently Chief Clerk in the Auditor's office of the Flint & Pere Marquette road.

**Wagner Sleeping Car Co.**—Mr. Augustus Schell has been chosen President in place of Webster Wagner, deceased.

**Walla Walla & Columbia River.**—This company has elected C. H. Prescott President; H. M. Chase, Vice-President; C. B. Upton, Secretary and Treasurer. The road is owned by the Oregon Railway & Navigation Company.

**Western & Atlantic.**—At the annual meeting in Atlanta, Ga., Feb. 2, the old officers were re-elected, as follows: President, Hon. Joseph E. Brown; Vice-President, E. W. Cole; Superintendent, R. A. Anderson; Secretary and Treasurer, W. C. Morrill.

**Wheeling & Lake Erie.**—At a meeting held in Norwalk, O., Feb. 1, the board elected J. G. Kinney, of New York, President, and Noah H. Swayne, of Toledo, Vice-President.

**Wisconsin Central.**—Mr. Wm. Hancock has been appointed Road-Master of the Milwaukee & Northern Division in place of M. Guilford, who has gone to the New York, Chicago & St. Louis road.

#### PERSONAL.

—Mr. J. W. Brown has resigned his position as General Superintendent of the Texas & St. Louis road.

—Mr. J. W. Holloway, Master Mechanic of the Cleveland, Akron & Columbus road, has resigned on account of ill health.

—Mr. John Dean, a prominent merchant of Worcester, Mass., died in that city Feb. 7. He was a director of the Providence & Worcester Company.

—Mr. E. W. Clark, for some time past President of the Lehigh Coal & Navigation Company, will retire from that position at the approaching annual meeting.

—Mr. M. Guilford, Road-Master of the Milwaukee & Northern Division of the Wisconsin Central, has resigned to accept a position on the New York, Chicago & St. Louis road.

—It is reported that Mr. R. S. Veech, President of the Louisville, New Albany & Chicago Company, will shortly retire from that position to devote himself to his private business.

—Mr. Samuel Wallace, Assistant to the President of the Chicago & Grand Trunk Company, died in Montreal, Jan. 29, of typhoid fever. He was taken sick in Chicago, and carried to his home in Montreal a week before he died.

—Major D. W. Washburn, General Superintendent and Chief Engineer of the International Improvement & Construction Company, was killed Feb. 7, a train striking the hand car on which he was riding, near Waco, Tex. His body was taken to his former home in Ohio.

—Mr. Joseph S. Harris, for some time past General Manager of the Central Railroad of New Jersey, has resigned his position. It is understood that Mr. Harris is to be President of the Lehigh Coal & Navigation Company. He was

formerly with that company as Chief and Consulting Engineer.

—Mr. D. Thomas Vail, who died in Troy, N. Y., last week, was born in that city in 1814, and for many years had been a prominent citizen. He was at one time a director and Vice-President of the Hudson River Railroad Company, and was for several years President of the Troy & Boston Company.

—Mr. David Jones, a well-known civil engineer, died at his residence near Titusville, Pa., Feb. 5. Some years ago he retired from business and has since lived on his farm. He had been engaged in railroad and other work in England and the United States, coming first to this country in the service of the Atlantic & Great Western Company.

—Gen. Walter Gwin, of Richmond, Va., died Feb. 6, while on a visit to Baltimore. He was 80 years of age. He graduated from West Point in 1822, and served 10 years as a lieutenant in the Engineer Corps. After resigning he was for several years employed as a civil engineer on the Baltimore & Ohio road. He was afterwards Chief Engineer of the James River & Kanawha Canal, and was employed on many other important works in Virginia and the Carolinas. During the war he was Chief of Engineers of the Confederate army.

—On the night of Jan. 3 last died at Vienna William Hellwig, formerly Chief Engineer of the Gotthard Railroad, a few days after the great tunnel of which he had charge was opened for traffic. Hellwig, who was 54 years of age, after studying at the university at Kiel and serving as an officer in the army, studied engineering at the Munich Polytechnicum. He served as an engineer first several years in Switzerland, and afterwards in Austria, where he had charge of the construction of the Brenner road and other important railroad work. He succeeded Gerwig on the Gotthard Railroad, and there had differences with the directory which led to his retirement and a law-suit. Afterwards he became a contractor on public works in Hungary. He was the author of several publications relating to works on which he was engaged.

—Mr. Wm. M. Wadley has resigned his position as President of the Central Railroad Company of Georgia on account of a difference of opinion with the majority of the board on the question of the issue of new obligations based upon the steamship property of the company. Mr. Wadley is, we believe, a Northern man by birth, but a Georgian by residence for many years, and has been in the service of the Central Company almost all his active life. Rising gradually to the position of President, he has been for many years the controlling power in the company, its head in fact as well as in name, and his retirement removes from active life one of the most prominent of Southern railroad men. He was re-elected President a little over a month ago, although known to be opposed to the policy favored by a majority of the board, but his positive nature could hardly brook a decision directly contrary to his strongly expressed opinions. Indeed, those who know him well say there have been for some time indications that he has been growing restive under the controlling influence which the Louisville & Nashville interest has acquired in the company, and to them his retirement is not unexpected. He has known the road so well and has been identified with it so many years that his place cannot easily be filled.

#### TRAFFIC AND EARNINGS.

##### Railroad Earnings.

Earnings for various periods are reported as follows:

	1882.	1881.	Inc. or Dec.	P. c.
Month of January:				
Bur. & N. Y.	\$252,823	\$167,749	I.	\$85,074 50.6
Chi. & Alton	379,447	490,120	I.	80,357 16.1
Chi. & Eastern Ill.	149,588	125,456	I.	24,132 19.2
Chi. & Gd. Trunk	115,549	102,373	I.	13,176 12.9
Chi. St. P. & M. & O.	307,591	257,785	I.	49,806 19.0
Col. H. V. & Tol.	214,166	198,312	I.	15,854 8.0
Denver & R. G.	491,914	307,474	I.	184,440 60.1
Ind. Bloom. & W.	200,693	180,778	I.	19,915 11.0
Long Island	118,776	103,776	I.	14,999 14.4
Mil. L. S. & W.	65,293	39,077	I.	26,216 67.2
Minn. & St. Louis	122,572	55,308	I.	67,264 121.6
Mobile & Ohio	161,433	224,346	D.	62,913 24.8
Northern Pacific	230,800	116,508	I.	123,292 105.8
Ohio Southern	32,043	.....	.....	.....
Or. Ry. & Nav. Co.	392,500	134,581	I.	257,919 191.1
Net earnings	100,500	98	I.	190,402
St. L. & San Fran.	256,000	212,400	I.	44,300 20.8
St. P. Minn. & Man.	395,460	254,187	I.	141,273 55.6
Tol. Del. & Bur.	76,078	46,950	I.	29,128 61.9
Wab. St. L. & P.	1,229,965	418,348	I.	811,617 194.2

Third week in January:

N. Y. & New Eng. \$57,700 \$50,594 I. \$7,106 14.0

Week ending Jan. 14:

Grand Trunk \$37,607 \$39,107 D. \$1,500 38.4

Year ending Dec. 31:

Chi. & N. W. \$21,849,211 \$19,416,008 I. \$2,433,203 12.5

Net earnings 10,292,318 9,818,528 I. 473,791 4.8

Month of November:

St. John & Maine \$14,084 \$9,040 I. \$5,044 56.1

Net earnings 3,271 1,208 I. 2,063 171.9

##### Grain Movement.

For the week ending Jan. 28 receipts and shipments of grain of all kinds at the eight reporting Northwestern markets, and receipts at the seven Atlantic ports, have been, in bushels, for the past six years:

Year.	Northwestern receipts.	Northwestern shipments.	Atlantic receipts.
1877	1,721,443	839,321	1,546,128
1878	3,513,465	2,272,058	2,692,375
1879	3,597,455	1,350,918	1,778,971
1880	3,652,141	1,371,994	3,631,855
1881	3,287,692	1,656,550	2,053,554
1882	5,297,541	3,156,232	1,905,946

The receipts of the Northwestern markets show a large increase over the previous week even, and are entirely unprecedented for a winter week. The shipments of these markets are also larger than before in January, nearly twice as great as in the corresponding week last year. Of these 106,535 bushels, or 3.4 per cent., went down the Mississippi, and the rail shipments are the largest since the first week of the railroad war, were exceeded in but three other weeks of 1881 (in April) and were never equaled before 1881. The receipts at Atlantic ports, however, are smaller than the week before, smaller than in the corresponding week of 1881, when the snow blockades reduced them, and only about half as great as in 1880, the western receipts and shipments were not nearly so large.

Of the Northwestern receipts Chicago had 44.3 per cent., St. Louis 17.1, Peoria 14.7, Milwaukee 13.5, Toledo 6, Detroit 2.3, Cleveland 1.7 and Duluth 0.4 per cent. At most noticeable feature is the unusually large receipts at Milwaukee—larger than in any week of 1881, and more than double its average weekly receipts then, and exceeded in but three weeks of 1880. At all places, however, the receipts were unusually large—the largest since October at Chicago and Toledo, and the largest since September at



St. Louis and Peoria. More than three-fourths of the total receipts were corn and oats.

Of the Atlantic receipts New York had 56.6 per cent., Boston 16.6, Philadelphia 14.8, Baltimore 5.5, Portland 4.4, New Orleans 1.4 and Montreal 0.7 per cent. The receipts of Baltimore are the smallest shown on a record covering every week since 1875, and there are but one or two weeks in that time that its receipts were not more than twice as great as the 105,050 bushels reported for this week ending Jan. 28, 1882. Receipts are everywhere small, however.

Exports for the week ending Feb. 1 were 835,440 bushels of grain and 70,467 barrels of flour this year, against 2,029,828 bushels of grain and 123,920 barrels of flour in the corresponding week of 1881. For eight successive weeks exports this year and last have been:

	1881-82.	1880-81.	Decrease.	P. c.
Flour, bbls.	455,345	1,100,702	705,417	60.8
Wheat, bu.	5,308,625	11,441,782	6,073,157	53.1
Corn, bu.	3,364,610	5,535,151	2,170,541	39.2
Rye, bu.	143,597	198,032	54,435	27.4
Peas, bu.	135,580	208,568	72,988	35.4
Oats, bu.	34	500	466	93.2
	11,061,498	22,607,462	11,545,964	50.9

This enormous decrease in exports shows no signs of changing. The exports of the last week were among the smallest of the season and below the average of the eight weeks. Flour and wheat make up 9,247,534 bushels, or four-fifths, of the total decrease in exports.

Exports of flour and wheat from San Francisco for the calendar year were as follows, wheat in bushels and flour in barrels, flour reduced to wheat in the totals:

	1881.	1880.	1879.
Flour, bbls.	785,078	560,770	511,600
Wheat, bu.	33,344,233	15,753,498	17,566,995
Total, bushels.	37,269,623	18,557,348	20,124,995

Exports of California barley by sea for the six months of the crop year from July 1 to Dec. 31 were 76,610 casks. Shipments overland for the same period were 122,263 casks, making a total of 197,873 casks. The barley crop of 1881 was only about one-half of that of 1880.

Receipts at Chicago and Milwaukee for the five weeks ending Feb. 4 have been (including flour):

	Receipts.	1881.	Shipments.	1881.
Chicago	12,931,218	9,192,352	10,254,539	8,032,862
Milwaukee	3,989,519	2,869,382	2,891,660	2,220,953
Both	16,920,737	12,061,734	13,146,199	10,253,815

In the total there is an increase of 40.3 per cent. in receipts and of 28.2 per cent. in shipments. The receipts exceeded the shipments by 3,774,538 bushels this year, and by 1,807,919 last year, yet the shipments were much the largest ever made in a winter month.

Receipts at four Eastern ports for the week ending Feb. 4 have been:

Bushels:	New York.	Boston.	Phila.	Baltimore.	Total.
1882	984,159	735,905	279,309	116,442	2,115,806
1881	612,142	266,429	312,200	514,705	1,705,476
P. c. of total:					
1882	46.5	34.8	13.2	5.5	100.0
1881	35.9	15.6	18.3	30.2	100.0

For the five weeks from Jan. 1 to Feb. 4 receipts have been, including flour:

Bushels:	N. Y.	Boston.	Phila.	Balto.	Total.
1882	6,320,800	2,344,282	1,071,301	1,114,655	11,453,198
1881	6,722,803	2,519,921	1,865,732	2,230,215	13,338,681
1880	6,232,070	2,075,567	1,803,130	2,485,280	12,596,047
P. c. of total:					
1882	55.2	20.5	14.6	9.7	100.0
1881	50.4	18.9	14.0	16.7	100.0
1880	49.5	16.5	14.3	19.7	100.0

New York and Boston have 75.7 per cent. of the receipts this year, against 69.3 last year.

There is a large increase of flour receipts at Philadelphia, but decreases elsewhere.

#### Pacific Through Freight.

Shipments of through freight eastward from California in December were, in tons:

	Central Pacific.	Southern Pacific.	Total.
San Francisco	4,572	802	5,374
Interior points	936	492	1,428
Total	5,508	1,294	6,802

The shipments were the lightest for many months. Leading items of freight were 1,970 tons wool, 341 tons salmon, 313 tons tea, 216 tons beans.

Excluding 316 tons from Los Angeles, which would hardly go to the Central in any event, the Southern Pacific carried 15 per cent. of the total shipments.

#### Ticket Commissions.

A dispatch from Cincinnati, Jan. 21, to the Chicago Tribune says: "Mysterious little yellow cards were distributed to-day in the envelope of a Chicago line which read as follows: 'No Feb. 1 in ours, S. I. Y. V. A. U. These letters may be the initials of our next President, but they ain't.' The key to this singular notice was discovered, and is, 'Send in your vouchers as usual.' The boys for whom it was intended had no difficulty in deciphering it. This is, of course, in direct violation of the solemn agreement not to pay commissions to the ticket agents of other roads or allow their own agents to accept commissions. The agreement was to have gone into effect to-morrow, Feb. 1. In the present instance the date for the agreement to go into effect had not yet arrived before arrangements had been made to violate it." The Tribune, however, says these cards were sent out by a road not in the Association.

#### Passenger Rates.

A meeting of the passenger and ticket agents of the Eastern and Western lines was held at the office of Commissioner Fink in New York, Feb. 8. There were present representing the Eastern lines J. N. Abbott, of the Erie; C. B. Meeker, of the New York Central; J. R. Wood, of the Pennsylvania; C. K. Lord, of the Baltimore & Ohio; J. Stephenson, of the Grand Trunk, and E. Gallup, of the Boston & Albany; and representing the Western lines, A. V. H. Carpenter, of the Chicago, Milwaukee & St. Paul; F. Chandler, of the Missouri Pacific and leased lines; James Charlton, of the Chicago & Alton; W. A. Thrall, General Ticket Agent, and W. H. Stennett, General Passenger Agent of the Chicago & Northwestern, and W. H. Dixon, Commissioner of the Western Trunk Lines Passenger Association. The relations of the different roads and some other matters which were not made public were discussed. The question of rates was not considered at all. No business that came before the agents of the lines was closed up, and the meeting was adjourned until next day.

Dispatches from Chicago Feb. 8 said that the officers of the Grand Trunk complained that the Vanderbilt roads and the Pennsylvania road had not yet withdrawn from points in the West and Northwest their cheap tickets, so that

scalpers sent to Milwaukee and bought tickets to New York and Boston over their lines, which were sold as follows: Milwaukee or Chicago to Boston, first class, \$14; second class, \$11; to New York, first class, \$14; second class, \$12. Arrangements are being made to adjust this matter. Arrangements are also being made to adjust the difficulty between the Boston & Albany and the Central Vermont roads.

#### Chicago and Milwaukee Receipts.

For the first week in February receipts have been for four successive years:

	1879.	1880.	1881.	1882.
Chicago:				
Grain, bu.	1,285,371	1,101,168	1,388,471	1,960,920
Flour, bbls.	86,174	29,535	108,591	111,919
Hogs, No.	157,572	158,108	158,488	135,076
Milwaukee:				
Grain, bu.	325,190	208,663	226,435	481,772
Flour, bbls.	58,227	22,116	42,940	64,600
Hogs, No.	20,395	12,738	9,028	10,980

Receipts of both flour and grain at both places are much larger this year than in any other.

Reducing flour to grain the aggregate receipts of the two places have been:

	1879.	1880.	1881.	1882.
Bushels.	2,260,594	1,542,260	2,294,705	3,237,441

The receipts this year are 41 per cent. more than last year and 110 more than in 1880.

#### Coal Movement.

Anthracite tonnages for the month ending Jan. 28 are reported as follows, the tonnage in each case being only that originating on the line to which it is credited:

	1882.	1881.	Inc. or Dec.	P. c.
Philadelphia & Reading	369,160	360,306	I. 8,854	2.4
Northern Central, Shamokin Div., and Summit Br. R. R.	81,154	66,893	I. 14,261	21.3
Sunbury, Hazleton & Wilkesbarre	523	I.	523	..
Central of N. J., Lehigh Div.	288,530	184,302	I. 104,228	56.6
Lehigh Valley	332,536	329,629	I. 2,907	0.9
Pennsylvania & N. Y.	11,410	2,675	I. 8,735	326.5
Del., Lacka. & Western	269,085	247,716	I. 21,369	8.6
Del. & Hudson Canal Co.	209,507	198,572	I. 10,935	5.5
Pennsylvania Coal Co.	65,802	67,945	D. 2,143	3.2
State Line & Sullivan	3,650	4,514	D. 864	19.2
Total anthracite	1,631,357	1,462,552	I. 168,805	11.5

The tonnage of anthracite for the corresponding period for eight years has been:

	1882.	1881.	1880.	1879.
Anthracite	1,631,357	1,462,552	1,211,022	1,103,933
Bituminous	1,682,636	1,676,000	1,245,232	1,038,937
Total	3,314,000	3,138,552	2,456,254	2,142,870

The anthracite market is at present somewhat overstocked, except for some special sizes, and prices are not well maintained. The companies believe that the partial suspension arranged for February will reduce stocks and bring prices generally up to the lists.

Actual tonnage passing over the Pennsylvania & New York road for the two months of its fiscal year from Dec. 1 to Jan. 28 was as follows:

	1881-82.	1880-81.	Inc. or Dec.	P. c.
Anthracite	169,011	111,170	I. 57,841	52.1
Bituminous	68,677	72,494	D. 3,817	5.3
Total	237,688	183,664	I. 54,024	29.4

The increase in anthracite is mainly in west-bound tonnage to the Erie road.

Semi-bituminous tonnages reported for the month were as follows:

	1882.	1881.	Inc. or Dec.	P. c.
Cumberland	150,990	99,387	I. 51,603	51.9
Huntingdon & Broad Top	16,948	17,943	D. 995	5.5
East Broad Top	8,035	5,186	I. 2,849	54.5
Tyrose and Clearfield	185,002	130,745	I. 54,257	41.4
Bellefonte and Snow Shoe	10,508	2,961	I. 7,547	255.0
Total semi-bituminous	371,183	256,122	I. 115,061	44.9

Actual tonnage passing over the Huntingdon and Broad Top road for the month was:

	1882.	1881.	Inc. or Dec.	P. c.
Broad Top coal	16,948	17,943	D. 995	5.5
Cumberland coal	28,926	17,945	I. 10,981	61.1
Total	45,874	35,888	I. 9,986	27.7

The Broad Top coal is mined on the line; the Cumberland carried through for the Pennsylvania Railroad.

Shipments of Cumberland coal away from the region for the month were:

	1882.	1881.	Increase.	P. c.
Baltimore & Ohio R. R.	112,727	79,383	33,344	42.0
Bedford Div. Pa. R. R.	27,424	14,136	13,288	94.2
Total	140,151	93,517	46,634	49.9

The George's Creek & Cumberland road carried this year 17,250 tons from the mines; last year it was not open in January.

Bituminous tonnages reported for the month are:

	1882.	1881.	Inc. or Dec.	P. c.
Barclay R. R. & Coal Co.	32,729	35,207	D. 2,478	7.1
Allegheny Region, Pa. R. R.	32,292	18,688	I. 14,604	78.1
Penn. & Westmoreland	102,586	69,488	I. 33,098	47.5
West Pa. R. R.	26,080	28,893	D. 2,813	9.7
Southwest Pa. R. R.	2,215	3,593	D. 1,378	3.8
Pitts. Region, Pa. R. R.	53,222	52,171	I. 1,051	2.0
Total bituminous	250,124	208,030	I. 42,094	20.3

The bituminous trade shows some singular changes, which the returns of later months may perhaps explain.

Coke tonnages reported for the month are as follows:

	1882.	1881.	Inc. or Dec.	P. c.
Bellefonte & Snow Shoe	2,672	805	I. 1,867	233.0
Allegheny Region, Pa. R. R.	8,532	7,536	I. 996	13.1
Penn. & Westmoreland	22,532	13,075	I. 9,457	72.7
West Pa. R. R.	10,802	6,559	I. 4,243	64.3
Southwest Pa. R. R.	144,344	127,314	I. 17,030	13.4
Pitts. Region, Pa. R. R.	48,628	39,565	I. 9,063	22.9
Total coke	237,510	194,854	I. 42,656	21.9

Shipments of coal from Rich Hill, Mo., in January were 1,001 car loads by the Kansas City, Ft. Scott & Gulf road and 1,402 car-loads by the Missouri Pacific, a total of 2,403 loads, or about 28,836 tons.

A dispatch from Philadelphia, Feb. 7, says: "A conference of representatives of the New York, Lake Erie & Western, Philadelphia & Erie, Buffalo, Pittsburgh & Western, Pennsylvania, and Allegheny Valley railroad companies was held this afternoon in the new Broad street station of the Pennsylvania Railroad Company for the purpose of agreeing upon a basis of tolls and percentages for the bituminous coal trade. An agreement was reached, but its details were not made public."

#### Chicago Lumber Traffic.

Receipts and shipments of lumber at Chicago for the month from Jan. 1 to Feb. 1 have been:

	1882.	1881.	Increase.	P. c.
Receipts	19,410,000	18,043,000	1,367,000	7.6
Shipments	87,916,000	65,399,000	22,517,000	34.4

The snow blockades probably reduced shipments last year.

This year there were receipts by lake nearly every week in January.

#### THE SCRAP HEAP.

##### Locomotive Building.

The Taunton Locomotive Works, at Taunton, Mass., are completing several heavy freight engines for the Old Colony road.

The sum of \$300,000 has been subscribed to establish new locomotive works in Schenectady, N. Y., and the subscribers will meet soon to complete the organization. Plans for the buildings have already been prepared. The works will be known as the McQueen Locomotive Works. Ex-Senator Stanford, Walter McQueen, formerly Superintendent of the old Schenectady works, Walter A. Jones, President of the Jones Car Works, F. W. McCamus, President of the City Bank, are the principal owners.

The Dickinson Manufacturing Co., at Scranton, Pa., is busy and has a number of orders for locomotives to fill, including a large one for the New York, Lackawanna & Western road.

The Peoria & Farmington road recently received an engine, with 17 by 21 in. cylinders, from the Rhode Island Locomotive Works.

##### Car Notes.

The Middletown Car Works of Schall & King, at Middletown, Pa., now employ 175 men. They have lately completed contracts for over 700 narrow-gauge cars, and are now at work on a contract for freight cars for the Intercolonial Railway, of Canada. The buildings include an erecting shop, 70 by 275 ft.; planing mill, 45 by 150 ft.; carpenter and pattern shop, 50 by 120 ft.; blacksmith shop, 40 by 160 ft.; foundry, 60 by 160 ft.; repair shop, 20 by 130 ft.; machine shop, 50 by 50 ft.; oil and paint house, 20 by 35 ft. All these buildings, excepting the repair shops and paint house, are brick structures with slate roofs. The shops have lately been supplied with electric lights.

The Kentucky Central shops in Covington, Ky., lately finished 40 flat cars, and have orders to build 3 baggage and express, 2 caboose and 75 box cars for the road.

The Smith & O'Leary Steam Forge Works in Chicago lately received a large order for car forgings to go to Mexico.

It is proposed to establish car works in Shelbyville, Ind., and some subscriptions have been secured.

The following statement in reference to Chicago, Burlington & Quincy rolling stock will interest many of our readers: Of the new equipment acquired during 1881, there were bought 20 locomotives, 1 officers' car, 400 grain cars, 275 stock cars, 263 coal cars, and 1 boarding car; while the work at the Aurora shops included the building of 9 locomotives, 1 stateroom car, 3 baggage, mail and express cars, 20 way cars, 200 grain cars, 377 stock cars, 56 coal cars, 8 hand cars and 1 rubble car. This shows a total new equipment of 29 engines and 1,619 cars of all classes, 9 engines and 677 cars being built in Aurora. During the year there was also rebuilt new in these shops 15 engines, 2 passenger cars, 1 mail, 11 way, 313 freight, and 62 coal and flat cars; 30 freight car bodies, and 115 coal and flat car bodies; and the total number of cars repaired here was 51,600. The average cost of rebuilding freight cars new is \$550 each; coal cars, \$460; freight car bodies, \$250, and coal car bodies, \$185.—Aurora (Ill.) Beacon.

The LaFayette Car Co., at LaFayette, Ind., built during 1881 in all 25 cabooses, 2,418 freight cars and 255 hand cars.

##### Bridge Notes.

The Edge Moor Iron Co., near Wilmington, Del., has lately completed a bridge over the Schuylkill River at Nowra, New South Wales. It has seven spans of 124 ft. each, one span of 181 ft. and one of 50 ft., making 1,103 ft. in all. The bridge rests upon piers composed of groups of iron cylinders. It is at present used as a highway bridge only, but is built to carry a railroad track also.

The Central Bridge Co., of Buffalo, N. Y., has taken the contract to build the bridges on the New York, West Shore & Buffalo road between Albany and Utica. The company is at work on a contract for the bridges on the Buffalo, Pittsburgh & Western Extension from Brocton to Buffalo, including two spans of 150 ft. each, one of 125 ft. and a number of smaller bridges. Other contracts on hand include two iron trestles, one 540 ft. and one 60 ft. long, for the New York Chicago & St. Louis; a bridge over Diablo Canon, in Arizona, for the Atlantic & Pacific, having two spans of 100 ft. each, seven of 40 ft. and two of 30 ft., 220 ft. high; a bridge 300 ft. long for the Illinois Central, and a bridge of 180 ft. span for the Kansas City, Lawrence & Southern Kansas.

##### Iron and Manufacturing Notes.

The directors of the Powell Iron and Nail Works, at Chattanooga, Tenn., have elected H. L. Fox, of St. Louis, President, and H. G. Young, Manager. The works are to be enlarged by the addition of machinery for making fish-plates and spikes.

The New York Belting and Packing Company had a stock of rubber belting, packing and hose valued at \$150,000, besides a large stock of emery wheels, destroyed by the burning of the old World building in New York last week. In less than an hour after the fire the company had a new warehouse secured close by the old one, and is now transacting business as usual. There was about \$100,000 insurance on the goods destroyed.

Maidencreek Furnace, in Berks County, Pa., has been sold to Jacob K. Spang, of Reading, for \$35,000. It is a charcoal furnace, and the property included 1,300 acres of land, over 1,000 acres woodland.

On the Coleman and Freeman iron estates, at Lebanon and Cornwall, Pa., there are 10 blast furnaces, with a capacity of 2,000 tons of pig iron a day.

Oliphant Furnace, in Fayette County, Pa., went into blast recently and is doing very well.

Lemont Furnace, in Fayette County, Pa., has gone out of blast for repairs.



may be regarded as minimum prices, however, and it is possible that the market may be firmer after these larger transactions. For small lots \$58 to \$60 at mill is asked, although, as in the above instance, heavy buyers will be likely to obtain moderate concessions."

Business in iron rails is light and quotations are nominal at \$38.50 per ton at mill for heavy sections up to \$53 for light rails.

Spikes are firm at \$3.15 to \$3.25 per 100 lbs. Fishplates are higher, say \$2.60 to \$2.75 per 100 lbs.; trackbolts, \$3.75 to \$4.25.

Old iron rails are irregular and quotations continue about the same as last week, although no large sales are reported.

#### Testing of Creosote or Dead Oils used for Preserving Timber.

A correspondent of the *English Mechanic* says of this subject: "The oils used for the purpose of pickling or preserving timber are obtained in the distillation of coal-tar. That portion of the distillate which has a specific gravity ranging from 1.000 to 1.060 is collected in separate receivers, and after a portion of it has been treated for carbolic acid, the remaining oil is considered as a creosote or dead oil. But commercial creosote oil does not consist of this portion of the distillate alone; all the oils obtained in the distillation of coal-tar, after they have been exhausted of their commercial products, if not otherwise salable, are mixed with the creosote oil. Creosote oil is used in immense quantities by the railway companies for pickling railway sleepers. Some idea of the extent to which this oil is used may be gathered from the fact that the probable annual produce of creosote oil in Great Britain exceeds 30,000,000 of gallons, and the great bulk of this is used by the railway companies and a few large timber establishments. Contracts for the supply of the oils are let by the railway companies and secured by tar-distillers for periods of from six to twelve months, certain conditions as to the quality of the oils supplied being specified in the contract, the following conditions, drawn up, or laid down, by Dr. Letheby some 20 years ago, being the most general: 'It should have a density between 1.045 and 1.055. It should not deposit any crystalline matter at a temperature of 40° Fahr., it should yield not less than five per cent. of crude carbolic acid to a solution of KHO, caustic potash, of the density 1.070 (14 Twaddell), and it should furnish 90 per cent. of liquid oil when distilled to the temperature of 600° Fahr.'

"It has never yet, I believe, been practically demonstrated that the presence of carbolic acid is essential for pickling purposes. The preservative quality of creosote oil is probably solely due to the fact that the wood saturated with oil is more impervious to water, and in consequence of the pores on the outer surface being filled with oil, is better able to resist atmospheric influences. In my humble opinion, it would be to the interests of the railroad companies to institute a series of experiments on the creosoting or pickling of timber with oils of various specific gravities. If the timber was first pickled with ordinary creosote oil, half the usual quantity, and afterwards with a heavier oil containing in solution, coal-tar pitch, good results would, I believe, be obtained, though the wood would not absorb so large a percentage of oil. This would be compensated for by the greater length of time the oil would remain unvolatilized in the wood. The oils containing pitch on the surface evaporating on exposure would leave the pitch in the pores of the wood, and would thus, as it were, hermetically seal them, preventing the oil in the interior from reaching the surface and evaporating."

#### Glass Roofing.

In a recent comprehensive paper to the Hanover Society of Engineers and Architects, Herr Schering makes a comparison of various kinds of glass roofing that have been constructed, and their cost of maintenance. The results of experience prove that there is less risk of injury from hail for such roofs than has generally been supposed, and that by far the greatest amount of fracture has occurred, not through hail, but through dead-weight, or casualties. Accordingly, in determining dimensions, dead-weight is primarily to be considered. Against hail, a glass thickness of 5mm. to 6mm. (1-5 in. to 1/4 in.), with the usual construction, may be considered quite safe; with thicknesses over 3mm. (3/8 in.) no considerable damage from hail is on record. It appears, on the other hand, that the thickness should not be carried beyond 10mm. to 12mm. (say 1/2 in.), else (probably on account of imperfect cooling) the glass is apt to break.

#### Allegorical.

The *Official Railway Guide* illustrates the origin of railroad wars by the following reference to sacred history: "Once upon a time the chief executive officer of a flourishing enterprise was enjoying to the utmost the material benefits of good management of the business entrusted to his care. He was assured of continued good results so long as he confined his efforts to the territory originally assigned to his charge. The receipts from the business were eminently satisfactory and the expenditures remarkably small, especially as the nature of the business rendered unnecessary that anything should be done in the matter of uniforming the employes. He had been warned, however, that an attempt to increase the receipts from sources outside of his legitimate territory would result disastrously to the whole business. For a while all went well. Finally the owner of a hopelessly bankrupt concern succeeded in persuading a subordinate officer of the flourishing corporation that great results could be obtained by the extension of the business into the forbidden territory. He, of course, had nothing to lose on his own behalf, and he knew that if he succeeded in getting the original compact broken he should ultimately be able to largely increase the gross receipts of his own concern. Unfortunately his efforts were successful, and the result to the heretofore flourishing business was as predicted. The executive officer, of course, laid the blame upon his wicked subordinate, who in turn revealed the wiles of the bankrupt tempter. The latter was too well satisfied with the result to attempt even to palliate the accusation, although universally recognized (begging Bob Ingersoll's pardon) as an adept at evasion."

"About six thousand years have passed since the above incident occurred as related, and yet many of its features will be recognized as aptly applying to events connected with railroad wars in past years, however, rather than recently. As history repeats itself, it is more than probable that such occurrences will happen again. Let us trust that, while the hope of reward and the fear of punishment was not sufficient in the case above stated to prevent disaster, that man has gained wisdom by experience, and in railway business in the future such lamentable results may be avoided."

#### Lost Baggage.

Little Jack had a Christmas present of a railroad. He hurriedly dragged out the engine, the cars, etc., and searched the box, though it was visibly empty. "Those are all the things," said his mother, "what are you looking for?" "The accidents,"—*Paris Figaro*.

The lost baggage department of the Pennsylvania Railroad is custodian of an ear, which was found a few mornings ago on the platform at the Market street station in Newark,

N. J. Any passenger who has accidentally or carelessly misplaced his or her ear can doubtless recover it on application to the proper officer.

#### Locomotive Expenses on a Narrow-Gauge Road.

The Norfolk & Ocean View Railroad is 8 1/2 miles long, from Norfolk, Va., to a point on Chesapeake Bay, where a summer resort has been established in sight of Cape Henry and Fortress Monroe. In summer the road does a large passenger business, but in winter its traffic is confined to freight and materials. Its gauge is 3 ft. 6 1/2 in.; there are two double-enders locomotives with tank on boiler, cylinders 8 by 18 in., drivers 36 in. diameter, built by T. W. Godwin & Co., in Norfolk. The fuel used is anthracite coal, which costs there \$6 per ton; the lubricating oil is West Virginia oil, costing 44 1/2 cents per gallon.

In the month of January the locomotive record was as follows: Miles run, 1,400, or 700 per engine; miles run to the ton of coal, 175; to the pint of oil, 43.75. Cost per mile run for repairs, 0.14 cent; for coal, 3.42 cents; for stores, 0.14 cent; for wages of engineers and firemen, 7.85 cents; the total cost being 11.69 cents per mile.

The average train hauled was four loaded cars. The cars weigh 6,600 lbs., and carry a load of 20,000 lbs. The rails on the road are 30 lbs. to the yard.

#### English Locomotives for America.

The last number of *Iron* contains the following statement:

"Mr. A. W. Rudd, of New York, has placed an order for 800 locomotives with a manufacturing house in England. The locomotives are intended for the Boston, Hoosac Tunnel & Western Railroad."

This is an extremely doubtful statement. It is questionable whether the road named will need 800 engines for a good while to come, and Mr. "Rudd" is unknown to any one in the railroad business in New York.

#### A Danger Signal.

The other morning, as the express train to San Jose was slugging along past San Mateo, with both valves wide open, the figure of a man was seen waving a red shirt about half a mile up the track. The engine was reversed, brakes were whistled down, and with a tremendous effort the train was stopped just as it reached the man.

"What's the matter?" shouted the conductor, running forward.

"Is this the lightning express to San Jose?" asked the stranger, earnestly.

"Yes, yes; of course it is," said the ticket puncher, while the passengers crowded up with white faces.

"That's right," said the man, pocketing his flannel and bracing up for a grand break. "Always tell the truth, and people will respect you."

And before the engineer could even seize a hunk of coal, he had a hundred yards' start to windward, with a fresh breeze on his weather beam.—*San Francisco Post*.

#### Fast Time.

The quickest long run ever made on the Central is said to have been made by the fast train last Friday. William Gould, with locomotive 190, drew the train, which was brought from Syracuse to Buffalo, a distance of 150 miles, in three hours and 17 seconds, including three stops, at Palmyra, Rochester and Batavia. The average speed, not including the time lost at the stations, is a mile in one minute and 18 seconds.—*Buffalo Express*, Jan. 19.

#### An Accommodating Railroad.

The *Wheeling Register* says: "The railroad which is to run from Wheeling to Charleston, W. Va., is asking for the free right of way through the farms on the line of its route. The agent inserts in the deed conveying the right of way, where that is given freely, as one of the conditions of the cession, that the railroad company shall stop at least one train each way on being flagged—at a point on the farm to be agreed upon, to take up or put off either passengers or freight. This will give every man on the line of the road a station of his own—he and his family can step on the cars at his own door to ride to the city or the nearest village to do business, or even ride to the next neighbor's on an errand or a visit."

#### Twenty-ton Coal-Cars.

It is said that the 20-ton coal cars built about a year ago by the Chicago, Burlington & Quincy Company have proved so satisfactory in use that the company has decided to make all its coal cars hereafter of the same pattern.

#### Compound Locomotive.

The *Engineer* says: "Mr. Webb, of the London & North-Western Railway, has made a compound locomotive. In order to get rid of coupling rods, two inside cylinders drive one pair of wheels, and two outside cylinders, placed about midway of the length of the frame, drive another or trailing pair of wheels, all being of the same diameter. Very little is known as yet outside of the Crewe shops respecting this engine. It is said, however, that it has attained a speed of 60 miles an hour."

A description, with the patent specification of this engine, was published in the *Railroad Gazette* of Nov. 4, 1881, page 620.

#### Stopping a Runaway.

Now and then, in quiet times of peace, emergencies spring up which demand the highest order of heroism. One of those emergencies occurred at Waynesboro on Wednesday of last week. Trains Nos. 22 and 14 and 12 and 16 on the Chesapeake & Ohio road, going east, had orders to meet and pass four sections of extra trains, coming west, at Blue Ridge. The extras were late, and as a consequence 11 trains were blocked on the main track above Waynesboro awaiting their arrival. After three of the extra trains had passed, the first section of No. 14 started out and commenced ascending the heavy grade to the tunnel. Rain and sleet were falling, and the engine of No. 14 being unable to draw its cars, the engineer of the train immediately following it, Mr. R. P. Irving, detached his engine from his own train, and coupling on to the rear car of No. 14, aided the ascent. After pushing the first train nearly a half mile and giving it a good start, Mr. Irving reversed his engine and started to return to his own train, but ere he had reached it he saw a detachment of the train he had left coming down the mountain at a rapid rate, it having become uncoupled from the engine. In an instant the intrepid engineer realized the peril of the situation. Thirteen heavily loaded cars were coming down a 75-foot grade, and each revolution of the wheels was adding velocity to its speed. With rare presence of mind and an iron nerve that few men possess, Irving started his engine to meet the descending mass and break the force of the collision. He ran up to within a short distance of the cars, and then reversing to lighten the shock clutched the lever in his firm grasp and bracing every nerve in his body awaited the catastrophe. A moment and the crash came. The shock of an avalanche could scarcely have been greater. One of the cars climbed up on the boiler of the engine and another was wrecked. But the brave man had accomplished his purpose. The wild train was stopped, and the engineer had saved many precious lives and thousands of dollars' worth of property.—*Staunton (Va.) Valley Virginian*, Jan. 26.

#### Traffic of the Metropolitan Railway, London.

In comparing the number of trains on this line with those on the New York Elevated roads the *Engineer* says: "The greatest number of trains run on one pair of rails is 16 in the hour out, and of course, 16 trains in. The greatest number of trains that have been run out of the station, on each pair of rails, would be on boat-race days, and then it has been about 20. Out of Farringdon street and King's Cross, where there are four pairs of rails, there are over 1,000 trains in the 24 hours, or 41.6 trains per hour on an average, and very much more than this during the busy hours. Through Moorgate street about 450 trains pass per day in, and the same number out, and from this station trains are dispatched in five directions, viz.: To Aldgate, to Mansion House and Hammersmith, to Snow-hill, London, Chatham and Dover Railway; to King's Cross, Great Northern Railway; to Kentish Town, etc., Midland Railway."

#### Wind Pressure.

During a storm of extraordinary violence which passed over a large portion of Scotland on Friday, Jan. 6, Prof. Grant made some valuable observations at the Glasgow University. They are reported as follows in *Engineering*: "A little before noon the Robinson anemometer indicated a movement of the air amounting to 63 miles an hour, and at times the rate was even greater. By means of the same instrument it was shown that in the period of fifteen minutes, from 11:50 a. m. till 12:05 p. m., the wind had traveled over a space of 20 miles, thus showing a velocity of 80 miles an hour; indeed, there were several enormous gusts of wind far exceeding that average velocity. The Osler anemometer showed a wind pressure decidedly greater than that of the great storm of Nov. 22, 1881, and consequently exceeding any wind pressure known in Glasgow during the last quarter of a century. At the time when the storm raged most violently it several times registered a pressure of 51 lbs. on the square foot."

#### A Lively Station Agent.

An agent on the Pittsburgh, Bradford & Buffalo road had a dance in the depot a few evenings since. The same agent has been collecting money for Guileau recently. He forwarded \$32 to the murderer Friday. To-day Superintendent Manderville gave him a walking paper, and the chap will be obliged to dance and collect Guileau money in some other depot.—*Titusville (Pa.) Herald*, Jan. 16.

#### Continuous Brakes on Railways.

At the annual meeting of the Amalgamated Society of Railway Servants, last October, in Manchester, England, it was decided to introduce a bill into Parliament to compel the companies to carry out the recommendations of the Royal Commission for providing continuous brakes. This bill is now being prepared, and Earl Delawarr has promised to take charge of it in the House of Lords. In the meantime petitions are being prepared for the signatures of the public and of railway men, urging on both houses of Parliament the necessity of passing this measure.

#### Burning Refuse Coal on the Reading Railroad.

According to the report of the Receivers of this company during the year ending Nov. 30, 1881, twelve locomotives for passenger and yard service were built in the shops of the company and 30 consolidation engines adapted to the use of waste anthracite for fuel were bought of the Baldwin Locomotive Works. The report says further:

"There are now in the service of the company 85 freight and coal-train locomotives adapted to the use of refuse coal, 65 of which have used it exclusively since the commencement of their service. The prolonged drought of the past season has seriously interfered with the preparation of this fuel, but arrangements are now being made by which a full supply for all of the engines referred to will be obtained."

"Twenty-six of the 30 consolidation locomotives which were purchased from the Baldwin Locomotive Works have been employed in the main-line coal traffic during the latter half of the year, and have moved 25 per cent. of the total coal tonnage passing over the main line, using refuse coal exclusively for fuel."

"A statement of the actual work done by these engines, and of the cost of fuel used by them in comparison with that of the ten-wheel engines, which they replace, is appended:

	Kind of engine.	
	Ordinary 10-wheel.	Consolidation.
No. of round trips	6,054	1,891
No. 8-wheel cars hauled	347,311	135,494
Weight of cargo, long tons	3,822,621	1,490,439
Total cost of fuel, including return of empty cars	\$169,788.96	\$6,684.33
Cost of fuel per ton carried 100 miles	5.6 cts.	0.6 ct.
Difference in cost	.....	5.0 cts.

"Equal to a saving in cost of fuel of more than \$2,500 per annum for each consolidation engine."

#### Lectures to Railroad Employes.

The first of a course of lectures to be delivered weekly to employes of the Baltimore & Ohio Company was given in Hollins Hall, Baltimore, on the evening of Friday, Feb. 3, by Prof. H. Newell Martin, the subject being "How Skulls and Backbones are Built." The lectures are to be on subjects of general interest and instruction, and will be delivered by professors in the Johns Hopkins University.

President Garrett introduced the lecturer and said that Johns Hopkins left all that portion of his estate invested in the stock of the Baltimore & Ohio Railroad Company to the university that bears his name, and that therefore the income from that stock was its chief support. The university had accomplished great good in many directions. It had occurred to him that the railroad company's employes and their families might secure some of the benefits to be derived from the university. It was thought a course of lectures would be a good means of conferring that benefit. To that end he talked with some of the professors, and four of them kindly consented to deliver lectures.

#### The Verdict on the Wells Bridge Accident.

The coroner's jury in the case of the persons killed by the fall of a bridge at Wells, Me., on the Boston & Maine road on Jan. 2 last, has agreed upon the following verdict:

"That said James C. Hodgdon came to his death on Jan. 2, A. D. 1882, at said Wells on account of injuries received that day occasioned by the car, in which he was then and there being conveyed by the Boston & Maine Railroad, falling, with other cars of the train, through the bridge of said railroad at said Wells, spanning the highway from Wells to Kennebunk, called Boothbay bridge. The broken bridge was an askew structure placed on stone abutments, and was composed of iron which, having been tested since the accident, showed quite a per cent. of crystallized iron, and some portions of said iron so tested did not stand the practical test they were submitted to by certain iron experts, while other portions showed good tensile strength. We find that said bridge was composed of iron of a quality originally too inferior for a structure of that style and dimensions, or that its quality had become deteriorated by use or other causes, the scientific evidence before us differing as to whether the



crystallization of said iron pre-existed or was produced by use and other causes. We express no opinion as to which view is correct. We further find that the breaking of said bridge was caused either by the weight of the engines attached to said train, and the concussion produced by the speed of the same over said bridge, or by the shock caused by the baggage car of said train being possibly derailed and running on the sleepers of said bridge—which is questioned by a part of said jury, at least—either or both of which causes, in our opinion, said bridge should have been sufficiently strong to have withstood, there being no evidence in our opinion sufficient to justify a belief that part of said train came in contact with the truss of said bridge before it gave way. We further find that said corporation has used all usual diligence in the inspection and care of said bridge, and find no occasion of censure in that respect. We think it apparent that any overhead bridge spanning a roadway, as did the bridge in question, and placed on abutments at an angle other than a right angle, is relatively weaker and its life much shorter than one spanning such roadway and placed on abutments at right angles; but the right to deflect such roadways to facilitate the crossing overhead by railroads being in the county commissioners or municipal officers, the jury suggests that such questions might more fitly be determined by the Railroad Commissioners of the state, they constituting a court of more special knowledge and experience, and that a change in the laws applicable thereto is desirable. We hereby commend the spirit of fairness manifested, and the valuable assistance rendered us by said corporation through its counsel, George C. Yeaton, during this investigation."

#### Precautions Against Accident.

The Committee on Railroads of the Connecticut Legislature is considering a bill requiring railroad companies to carry axes, crowbars and fire-extinguishers in their passenger cars; also to require the use of steam heaters instead of stoves.

The Boston & Maine Company has decided hereafter to use Baker heaters in its passenger cars, and to inclose the heaters in a room or casing of boiler iron.

The New York Central & Hudson River Company has ordered that a flagman or third brakeman be added to the crew of each freight train, in order that a signal may be sent out or left behind without crippling the train force.

#### Tree-Planting on the Line of the Northern Pacific.

General Manager Haupt of the Northern Pacific, during his last trip on the road, examined the country with special reference to tree-planting in the future. This was done in accord with general instructions given some time ago by President Villard. With Gen. Haupt's party was Mr. L. P. Hodges, who took great interest in the matter. It is the intention of the officers of the road to have the ground prepared this spring for future planting. The first row of trees will be 100 feet back from the track, and inside of that will be planted yellow cottonwood for the making of ties. This wood matures within five or six years, and the whole cost of the ties to the company would be only 10 cents apiece. The other woods will furnish timber for use, fuel for settlers, and seedlings for others who may desire to set out trees. Beside all this, there will be in a short time an impenetrable barrier against snow blockades in winter time. Settlers can also get plenty of material for fencing. The advantages to be secured are such that the Northern Pacific Company will push forward the enterprise with all dispatch. Mr. Hodges is quite enthusiastic over the matter, and will make it his constant study so as to secure valuable information that will facilitate the work. The planting will be done on the line of the Dakota and Missouri divisions.—*Chicago Tribune*.

#### Fast Time on the South Carolina Railroad.

The fast time scheduled below was made over the South Carolina Railroad, from Charleston to Columbia, under the following circumstances. The adjourned session of the State Legislature was convened on the evening of Jan. 11, 1882, and on the application of several members of the Charleston delegation General Manager Peck ordered a special train to be run for their accommodation. As the session was to open at 7 p. m., the hour of 2 p. m. was fixed for the departure of the train from Charleston, and the ample margin given the members by the time in which the distance was accomplished is shown by the schedule. There were 27 in the party, and much pleasure was expressed at the fine run made. While not the fastest on record, the rate of speed will compare favorably with that made on any railroad in the country. The actual running time for the 130 miles was 162 minutes, from which it is evident that for considerable portions of the distance a rate exceeding 60 miles an hour must have been attained. The engine is a wood-burner, and the road is not provided with track-tanks. When it is remembered that three years ago the iron in the track of this road was in such condition as to render safe transportation at any speed problematic, the record of the time made appears more remarkable, and certainly evinces the vast improvement made in the condition of the property under its present efficient management. The following is the schedule, kindly furnished us by D. C. Allen, General Passenger and Ticket Agent, from the records of J. H. Averill, Master of Transportation.

From	To	Distance.	Time.
Charleston	Summerville	22 miles.	26 min.
Summerville	Ridgeville	9 1/2 "	12 "
Ridgeville	George's	16 "	28 "
George's	Branchville	14 1/2 "	30 "
Branchville	Orangeburg	17 1/2 "	39 "
Orangeburg	St. Matthews	12 1/2 "	17 "
St. Matthews	Kingville	14 "	14 "
Kingville	Columbia	24 "	36 "
Total		130 miles.	178 min.

Deduct 16 minutes for stoppages. Total time, 2 hours 42 minutes.

Left Charleston 2 p. m.; arrived at Columbia at 4:58 p. m. Engine 55, built by Baldwin Works in 1870; rebuilt by South Carolina Railroad Company in 1881; cylinder 14 by 24 in.; 5-ft. wheel. Train composed of one combined car and one coach.—*Official Railway Guide*.

#### Naphtha for Fuel.

"Some experiments have been made of late," says the *Journal of the London Society of Arts*, "by the administration of the Tarras-Selo Railway Company for burning naphtha as fuel in locomotive engines. A tray of cast iron is fitted in the ordinary fire-box of the engine over the bars, and above this tray is fixed a grating of wrought-iron pipes placed crosswise and perforated with a number of holes in the lower side. By means of a larger pipe these pipes communicate with a cylinder of tin in the tender of the locomotive. This cylinder is divided into two unequal compartments, one containing naphtha and the other water. The flow of these liquids from the two compartments into the funnel end of the pipe leading to the hollow grating in the fire-box is regulated by a valve. The water acts as a pulverizer, and separates the stream of naphtha, bringing in this way a larger quantity of air in contact with the fuel, and so, it is said, causing more rapid combustion and increased heating power. The engine experimented upon gave

excellent results, and the railway company have applied to the government for authority to use this system of heating on train lines. The use of naphtha in some parts of Russia will be more economical than either coal or wood."

In 1876 the Russian government had an engineer in this country studying this subject of the utilization of petroleum as locomotive fuel. The Russian petroleum is in a very limited district, close to the Caspian Sea, and at present far from any railroad, but reached by vessels on the Caspian and the River Volga. An immense territory east and north of the Caspian has a very scanty supply of wood and coal, and east of the sea the government has an important military railroad through a desert, the fuel for which it must be very difficult to get, while petroleum can be brought by vessels across the sea. The engineer who was here in 1876 said that they had succeeded in using oil for steamboats, but had, so far, failed with locomotives.

It was not expected to use it where other fuel was plenty, but only where there was plenty of petroleum and scarcely anything else that would burn. It has been shown a great many times, except where coal or wood is very dear, or petroleum excessively cheap, a great deal more carbon or heat-producing material can be had for a dollar in the form of coal or wood than in the form of petroleum; yet announcement of inventions which are said to circumvent that fact are made from time to time, nevertheless.

#### Kyanizing Wood.

On the Eastern Railroad this process is now extensively used. The works are at Portsmouth, N. H., where about 600,000 ft. of lumber, including 15,000 ties, have been treated. None of these have yet been laid a year, so that no data indicating their durability can yet be obtained. The material used is corrosive sublimate dissolved in water, one pound of the former to 99 pounds of the latter. The wood is simply saturated in this liquid one day for each inch in thickness of the former and one day additional to insure thorough saturation.

The cost of the process is about \$1 per thousand feet for handling the lumber, and it takes from 4 to 4 1/2 lbs. of corrosive sublimate per thousand feet of wood. The sublimate costs 50 cents per pound.

#### Safety from Fire in Cars—Systems of Lighting and Heating a Train.

Railroad companies will suffer until their trains are rendered absolutely safe against fire. The first serious attempt of this kind is likely to be made by the Boston & Providence and the Stonington Railroad companies, who are considering the adoption of the Graydon safety heater on the well-known steamboat train between Stonington and Boston. It consists in taking steam from the engine, passing it around the train and back into the water-tank in the tender. The heater acts automatically, keeping an even, pleasant heat, and, of course, it can set nothing on fire. Neither can it by any possibility scald any one, no matter how severe or sudden may be an accident; it cannot be interfered with by the train being snowed up or thrown off the track, even though its fuel should run low. It costs less than \$40 to put it into a car, about \$10 to put the necessary attachment to a locomotive, and less than \$90 for each baggage car. There is absolutely no expense for heat, since the exhaust steam can be used, or the "blow-off," without taking any efficient force from the engine; moreover, it heats the feed water to a temperature of more than 100 degrees, so that warm water is pumped into the boiler instead of cold. Its cheapness, economy, simplicity, durability, and, above all, its absolute safety, make it the heater, above all others, that will satisfy the public and the railroad companies, for it is the only one that takes steam from the engine successfully.

But even though the stoves in each car were dispensed with, the lamps would still be grave sources of danger; and as light is as essential as heat, no train can be considered absolutely safe until this difficulty is overcome by a safety contrivance. This contrivance has been found in the Pintech system of lighting by gas. This gas is supplied from a reservoir on the top of the car, where it is stored under a pressure of about six or seven atmospheres. It is prepared by a special process which secures a large proportion of carbon, producing a very white light, and it does not condense and clog under pressure as ordinary gas would. An automatic valve regulates the pressure and the flow, so that no ordinary bump, or shock, or jolting, interferes in the slightest with the steadiness of the light.

This system is in use in Germany and in England, where the writer has seen it in constant operation for months on all the trains of the Metropolitan (underground) Railway in London. No one can fail to be struck by its brightness and steadiness, and the finest print can be read anywhere in these cars. It is also absolutely impossible for a train to take fire from it. Any shock that would break the lamps would instantly extinguish the light, as it is one of the peculiarities of gas that every burner within the influence of such a shock is put out instantaneously. Also it could not again become ignited, because the pipes being broken the small amount of gas in each car would dissipate itself in the atmosphere within less than half a minute. And as the reservoirs are on the top of the car, the gas will ascend in case of accident.—*Providence Press*.

#### OLD AND NEW ROADS.

**Atchison, Topeka & Santa Fe.**—The directors on Feb. 3 issued the following circular in relation to the subscription for \$16,500,000 Atlantic & Pacific bonds, one-third of which was offered to the stockholders of this company: "Owing to the changes going on in the ownership of the stock of the St. Louis & San Francisco Railroad Company the suspension of the sale of rights under the circular of this company, dated Jan. 20, 1882, was requested until the effect of these changes could be known. Your directors now, after mature consideration, are unanimously of the opinion that no further delay is necessary, and subscription and dealing in rights under the circular should go on. They are also of the opinion that it is important for the interests of this company that the amount called for by the circular should be provided in full. Your directors will individually subscribe for the full amount each is entitled to."

**Baltimore & Ohio.**—Rumors have been in circulation for some time about this company's New York connections. The latest report—which does not appear very probable at present—is that the company contemplates a connection by using the Western Maryland to Shippensburg, the Harrisburg & Potomac (when completed) to Harrisburg and the Reading and New Jersey Central thence to New York. The Harrisburg & Potomac link still requires some 10 miles of road and an expensive bridge over the Susquehanna to complete it.

Another report is that the company will soon begin work on the Delaware Western line between Baltimore and Philadelphia, and will build a loop around Philadelphia to make the Reading connection.

**Bellaire, Zanesville & Cincinnati.**—This company has been formed by the consolidation of the Zanesville &

Southeastern and the Bellaire & Southeastern companies. The Bellaire & Southeastern road is in operation from Bellaire, O., to Woodfield, 42 miles, and its extension is under contract to Caldwell, 25 miles further. Contracts will soon be let from Caldwell to the Muskingum River, and for a branch to Zanesville.

**Bodie & Benton.**—This company has been incorporated for the purpose of constructing a narrow-gauge railroad from a point near Mono Lake, in Mono County, Cal., to the town of Bodie. The company intends to purchase timber lands on Mono Lake, erect and operate saw-mills, and transport the lumber therefrom to market by means of the road, and also to construct a branch road from the south end of Mono Lake to a point connecting with the Carson & Colorado Railroad near Benton. The capital stock is \$2,000,000; the road will be about 80 miles long.

**Camden & Atlantic.**—Reports are current that negotiations are in progress for a sale of this road to the Pennsylvania Railroad Company; also that a controlling interest had been sold to Mr. F. B. Gowen for account of parties largely interested in the Reading road. The sale to the Pennsylvania is the most probable.

**Cape Fear & Yadkin Valley.**—The private stockholders at a meeting held in Fayetteville, N. C., Feb. 5, consented to the contract in which the state's controlling interest in the road is transferred to the New York & Southern Construction Company. The purchasers will have to pay \$155,000 in money by April 2, when possession of the road will be delivered.

**Central, of Georgia.**—At a meeting of the board held in Savannah, Feb. 7, it was decided to issue interest-bearing certificates to the amount of \$3,500,000 based upon the property of the Ocean Steamship Company, which is owned by this company, these certificates to be distributed to the stockholders as a dividend. This action was foreshadowed at the recent annual meeting, when a majority of the directors chosen were known to favor it. Immediately upon the passage of the resolutions, President Wadley, who had strongly opposed them, resigned his position.

The opposition party will take legal proceedings to enjoin the issue of the certificates.

**Central, of New Jersey.**—The engineers have completed the location of the extension of the High Bridge Branch from Port Oram, N. J., to Nolan's Point, to connect with the Ogden Mine Railroad. Work will soon be begun.

The bill authorizing the company to build a branch to the government powder depot at Picatinny near Dover, and granting the right of way through the government property there has been favorably reported by the Military Committee of the Senate.

**Chicago & Northwestern.**—This company has lately opened for business an extension of its Toledo & Northwestern Division from Algona, Ia., northward to Elmore, Minn., 33 miles. This makes the division 164 1/2 miles long from the main line at Tama.

A branch of this division has also been opened from Eagle Grove, Ia., west to Willow Glen, 34 miles.

The line of this division which is to run westward to a connection with the Maple River Branch, is opened for business from Dayton, on the Minneapolis & St. Louis Extension, westward to Lake City, 34 miles. An extension on each end is needed to complete it.

**Chicago, St. Louis & New Orleans.**—The reports of the lease of this road to the Illinois Central are pronounced premature by officers of the company. It is not, however, denied that a lease is under consideration. The management of the road has been for several years controlled by the Illinois Central, that company owning most of the stock.

**Columbus, Chicago & Indiana Central.**—The United States Circuit Court in Chicago has granted leave to certain holders of first-mortgage bonds to file a supplemental bill asking for a foreclosure of the mortgage and a sale of the road. The bill sets forth that the interest on the bonds is in default, and that the Pennsylvania Railroad Company has secured control of a majority of the bonds, with a view, as the plaintiffs believe, of evading its liabilities as guarantor of the lease of the road.

**Concord.**—In the suit of Burke and others against the Concord Railroad Company, the New Hampshire Supreme Court has ordered both parties to submit briefs before Feb. 20 on the question whether the propositions submitted for defendant show a defense in law, and whether the evidence in support of any or all of the facts alleged in those propositions should be admitted or excluded by the Court. The Court also orders that the parties may apply on March 6 for the privilege of making oral arguments as to the materiality of the facts set forth in the propositions as a justification of the pooling contract with the Boston & Lowell Company.

**Conoquenessing.**—This company has filed articles of incorporation in Pennsylvania to build a railroad from Butler northward to a point on the Shenango & Allegheny road, a distance of about 24 miles.

**Danbury & Norwalk.**—The stockholders have voted to accept the act of the Connecticut Legislature authorizing the extension of the road from its present terminus in South Norwalk, Conn., to deep water on Long Island Sound; also authorizing the issue of \$100,000 bonds to pay for the extension and for other purposes.

**Denver & Rio Grande Western.**—This company has issued a circular containing the following statements:

"The company has been successful in securing, on favorable terms, the right of way for its line, to connect Salt Lake city with the Denver & Rio Grande system, through the Mormon villages and agricultural districts of the great basin of Utah, together with 60 acres of well-chosen depot grounds in Salt Lake city; and grading has been completed to a point in the Grand River Valley, distant only 30 miles from the Colorado border, except north of Provo, where \$4,000 will cover the cost of finishing the work, and at two points east of the Wasatch Range, where the topography of the country rendered progress slow. Tracklaying has been commenced, and the company now owns or controls over 100 miles of finished road in Utah. All rails and fastenings necessary for the entire line from the Colorado border to Salt Lake city have been bought and paid for. Of these, sufficient to lay 120 miles of track have been delivered and are now on hand, chiefly in Salt Lake and Provo, together with some other necessary material, ties, etc."

"This division of the company's lines and that of the Denver & Rio Grande Railway Company now under construction from Gunnison City, Col., westward, will, when completed and united, constitute a continuous line of railway of uniform gauge extending from Denver and Pueblo, Col., to Salt Lake city and other points in Utah."

"The mutual interests of the respective companies have been still further assured, and the working of the lines in their joint interest has been rendered more permanent and certain by a traffic contract between this company and the Denver & Rio Grande Railway Company, whereby the latter has agreed to guarantee the payment of the principal and interest of the 6 per cent. first-mortgage bonds of this company up to \$7,500,000 (to be issued to an extent not ex-



ceeding \$16,000 average per mile), in consideration of acquiring valuable trackage and other rights which tie the two companies together in a mutually advantageous alliance."

**Eastern.**—This company is having surveys made for a branch or loop line to leave the main line near Newburyport, Mass., and run by Salisbury Beach, Hampton Beach, Boar's Head, Rye Beach and Newcastle, joining the main line again near Portsmouth, N. H. The line will run along the shore parallel with the main line and from two to four miles east of it, and will be about 17 miles long.

**East Tennessee, Virginia & Georgia.**—The difficulty with the Atlanta City Council has been settled, and work has been resumed on the grading of this company's line through Atlanta. The company agreed to make some slight changes in location, to avoid interference with the street grades more than was necessary.

On the extension of the company's Macon & Brunswick line from Macon to Atlanta, track is now laid from Macon northwest to Holston, nine miles. About 75 miles of grading are completed, and the track is advancing rapidly.

**Elizabeth City & Norfolk.**—This company proposes to extend its road from Edenton, N. C., to Washington and thence to Newberne. Arrangements are being made for the right of way, and the company has already secured depot grounds and water front at Washington and is now negotiating for the same facilities at Newberne.

**Flint & Pere Marquette.**—Trains have begun to run regularly over the extension of the Flint River Branch from Otter Lake, Mich., northeast to Fostoria, six miles. This track, we believe, was laid last year. The branch is now 21 miles long from the junction with the main line, four miles from Flint.

**Grand Rapids & Indiana.**—This company has lately completed a branch or extension from Petoskey, Mich., around the head of Little Traverse Bay to Harbor Springs, a distance of eight miles.

The mildness of the early part of the winter has enabled the contractors to keep at work on the extension from Petoskey to the Straits of Mackinaw, and the company expects to run trains through to the Straits by June 1. Connection will be made with the Detroit, Mackinac & Marquette by a steam ferry across the Straits to Point St. Ignace.

**Hannibal & St. Joseph.**—The Missouri Supreme Court has refused this company's application for a writ of error to the United States Supreme Court on the question of granting a writ of mandamus against the State Treasurer in the matter of the state aid bonds. The Court holds that there is no question for the federal court involved in the suit.

**Hocking Valley.**—Articles of incorporation of the Hocking Valley Coal & Iron Railway Company have been filed in Ohio. The company purposes building a railroad from Columbus to the Hocking Valley coal region on a line nearly parallel to that of the Columbus, Hocking Valley & Toledo road.

**Hudson Tunnel.**—The caisson from which the headings from the New York shore for the tunnel under the Hudson River will begin has been sunk to the proper level, and a number of men are now employed building an inverted arch formed of iron plates lined with brick, which will form the bottom of the caisson. This work is greatly hindered by the loose, sandy soil upon which the caisson rests, in which many fresh-water springs have been discovered. It is expected, however, that the flooring of the caisson will be completed in a week or ten days, and then openings will be cut in the side of the caisson, from which the headings will be worked. On the New Jersey side of the river work in the south tunnel has been stopped and the men are now engaged building a heavy bulkhead at the extreme end of the tunnel. When this has been completed the pressure of air will be removed from this tunnel. On the north tunnel, which extends about 100 ft. beyond the south tunnel, a number of men are building a brick bulkhead, and as soon as this is completed the air pressure will be removed and work will then be carried on in the south tunnel until the heading is level with the heading of the other tunnel, when a brick bulkhead will be built in the latter in which the air-locks will be placed.

**Indiana, Bloomington & Western.**—Track is reported laid from Springfield, O., eastward to Troy 25 miles, making in all 70 miles laid on the extension from Indianapolis to Springfield. Work is progressing on both ends of the line.

It is now stated that the surveys for the extension of the St. Louis Division to St. Louis will not be begun until spring opens.

**Indianapolis, Eel River & Southwestern.**—This company has filed articles of incorporation for a railroad from Indianapolis southwest to Vincennes, about 110 miles, the line to be generally to the northwest of the Indianapolis & Vincennes road.

**Kentucky & South Atlantic.**—This name has been adopted by the company formerly known as the Mt. Sterling Coal Railroad Company. The road is now in operation from Mt. Sterling, Ky., to Frenchburg Junction, 23 miles, an extension of eight miles from the old terminus at Chambers having been built last year.

**Knox & Lincoln.**—The representatives of the towns on the line, who own all the stock in this company, met at Damariscotta, Me., Feb. 2, and decided to submit the question of leasing the road to the Maine Central Company to popular vote at town meetings to be called in each town.

**Louisville & Nashville.**—The Legislature of Kentucky has passed the bill authorizing the Sinking Fund Commissioners of the city of Louisville to sell the stock in the Louisville & Nashville Company now owned by the city.

**Midland, of Canada.**—It is announced that this consolidated company and the Canada & Atlantic have made a contract for interchange of traffic and for the joint construction and use of depots and terminal facilities at Ottawa, when both roads are completed to that point.

**New Sharon, Coal Valley & Eastern.**—This company has resolved to change its name to Chicago, Burlington & Quincy. It is reported that the Chicago, Burlington & Quincy will assist in building the projected road.

**New York, Chicago & St. Louis.**—At a recent meeting of the board it was stated that the road would be in operation the entire length by Aug. 1. The roadway is all completed except 15 miles on the Chicago end and five on the Buffalo end. No trouble, the officers said, would be experienced in obtaining terminal facilities in either city. Two offers have been received in Chicago, one of which gives exceptional advantages. In Buffalo offers had been received from the Erie, from the New York, Lackawanna & Western, and from the New York, West Shore & Buffalo. The large iron viaduct at Cleveland 3,200 ft. long, will probably be the last piece of work finished. The contracts have been let and the contractors agree to have the viaduct in position by June 1.

**New York & Norfolk.**—This is now the name of the road originally called the Worcester & Somerset and afterwards known as the Peninsula Railroad of Maryland. It extends from Newtown Junction, Md., on the Eastern Shore road, to Pocomoke City, 10 miles. It is to be extended down the Eastern Shore to Cherrystone, Va., about 60 miles.

**New York, West Shore & Buffalo.**—This company has filed a map of its line through Erie County, N. Y., passing through the towns of Newstead, Clarence, Lancaster and Cheektowaga. The proposed line into Buffalo is thus described by the Buffalo Express:

"The road enters the city on the eastern boundary, runs parallel with Broadway, crosses the Erie Railway tracks and turns to the south on the property of B. S. Marvin. It intersects Becker street, crosses Broadway and the New York Central tracks near Curtis street, crosses Playter, Sears, and some small streets in that vicinity until it reaches Fillmore avenue. Here it runs parallel with the New York Central as far as Seneca street, where it takes the south side of the block bounded by Hamburg, Carroll, Seneca and Alabama streets, and the north side of Carroll street from Alabama, nearly up to Chicago street, where it crosses to the site for its depot, the block bounded by Exchange, Michigan, Carroll and Chicago streets, opposite the Erie depot."

**Norfolk & Western.**—A bill has been introduced in the Virginia Legislature to authorize this company to guarantee bonds to be issued by the South Atlantic & Ohio Railroad Company.

**Ohio.**—The stockholders of the Cincinnati, Hamilton & Dayton were to meet in Cincinnati, Feb. 8, to make arrangements for resuming possession of their road in case of a decision of the Supreme Court against the validity of the consolidation forming the Ohio Railroad Company.

The injunction recently obtained by James McHenry restraining Hugh J. Jewett from voting 11,477 shares of Cleveland, Columbus, Cincinnati & Indianapolis stock pledged by McHenry to secure a loan from the Erie, and subsequently transferred to the Erie by foreclosure proceedings and thereupon registered in Mr. Jewett's name as trustee, has been affirmed on appeal to the New York Supreme Court.

At the meeting held in Cincinnati, Feb. 8, there were about 12,000 shares represented. The meeting was an informal one, called by several stockholders for consultation. It was decided to prepare an agreement to surrender the stock to three trustees, with power to lease the road. Messrs. Wm. Hooper, Henry Hanna and M. Work were named as trustees. The agreement is to be submitted to stockholders for signature, and will not take effect unless signed by a majority.

**Ohio Central.**—The consolidation of this company and the Atlantic & Northwestern, of West Virginia, has been completed and the necessary certificates filed. The work of building the line across West Virginia, including the bridge over the Ohio River at Pomeroy, will be pushed forward. The name of the consolidated company continues to be the Ohio Central; the capital stock is fixed at \$35,000,000. An issue of securities to build the road in West Virginia will soon be made.

The Richmond & Allegheny is not included in the consolidation, as at first intended, and it now appears very uncertain as to whether this further consolidation will be carried out.

**Ohio & Mississippi.**—The committee, composed of W. T. McClintick, President of the company; Robert Garrett, James Sloan, Jr., of Baltimore, and Frank W. Tracey, of Springfield, Ill.—appointed at a meeting held in Cincinnati the first week in January to prepare a statement of the indebtedness of the company and give in detail the plan for taking the road out of the hands of a receiver, have completed their circular to be issued to the bondholders. It was thought last fall that \$2,000,000 would be sufficient to secure the restoration of its property. The committee finds that a larger sum would be necessary. The scheme embraces the creation of a new series of 5 per cent. bonds having 50 years to run, secured by mortgage covering the main line, Louisville Branch and Springfield Division, in all 624 miles, together with the rolling stock and other personal property, to the amount of \$16,000,000. Bonds will be reserved to take up old bonds when and as they mature as follows:

Income and funded debt bonds, due Oct. 4, 1882.....	\$174,000
First-consolidated bonds, due Jan. 1, 1898.....	6,772,000
Second-consolidated bonds, due April 1, 1911.....	3,829,000
Springfield Division bonds, due Nov. 1, 1905.....	2,009,000
Total.....	\$12,784,000

Of the remainder it is estimated that \$2,216,300 will be needed to pay off floating debt, and overdue coupons, special loans, etc., leaving \$999,700 to be used for additional equipment and terminal facilities. The committee think that this arrangement will place the company on a sound basis, and will somewhat diminish the interest charges.

**Oley Valley & Lehigh.**—This company has been finally organized and has filed articles of incorporation. The line of the proposed road is from Birdsboro, Pa., the junction of the Philadelphia & Reading and the Wilmington & Northern roads, through the Oley Valley to Seisholtzville, 25 miles. An extension northward to connect with the Lehigh Valley road is also proposed.

**Ontonagon & Brule River.**—This company has completed its track from Ontonagon, Mich., eastward 20 miles, and has made application to have this section inspected by the Governor of Michigan, to secure a certificate for the land grant.

**Oregon Railway & Navigation Co.**—The following statement is made for January and the seven months of the fiscal year from July 1 to Jan. 31:

	January.	1881.	1881-82.	1880-81.
Gross earnings.....	\$302,500	\$134,581	\$3,029,802	\$1,971,681
Expenses.....	202,000	134,483	1,462,531	994,209
Net.....	\$190,500	\$98	\$1,567,271	\$977,382

The small earnings for January, 1881, were due to the freezing up of the Columbia River in that and the preceding month.

**Petersburg.**—At a meeting of stockholders in Petersburg, Va., Feb. 5, arrangements were completed for the issue of new 6 per cent. bonds in place of the old second-mortgage 8 per cent. bonds. There are \$490,000 of these bonds outstanding.

**Pittsburgh, Bradford & Buffalo.**—Work has been suspended on the extension from Shippensburg, Pa., to Kane on account of the severe weather and snow.

At the recent annual meeting it was reported that the earnings of the 47 miles of completed road from the reorganization in April, 1881, to Dec. 31 last were \$51,817; expenses, \$39,215, leaving the net earnings \$12,602.

From the new mortgage bonds a sufficient amount has been received to pay off all the old debts, build new shops,

put the road and equipment in good order and grade 35 of the 40 miles of the extension to Kane.

**Pittsburgh, Cincinnati & St. Louis.**—It is reported that this company has made an agreement with the Wabash, St. Louis & Pacific for the use of the latter's Indianapolis, Peru & Chicago Division from Kokomo to Indianapolis. This section will be used to connect this company's Columbus, Chicago & Indiana Central line with the Jeffersonville, Madison & Indianapolis, making a pretty direct line between Chicago & Louisville.

**Richfield & Oneonta.**—It is proposed to build a railroad from Richfield Springs, N. Y., by Cooperstown to Oneonta on the Albany & Susquehanna road. The distance is about 28 miles.

**Rochester & Ontario Belt.**—This company has been organized to build a railroad from Lake Ontario at Charlotte, N. Y., to and around the city of Rochester, connecting with the New York, Lake Erie & Western, the Rochester & Pittsburgh and the Genesee Valley roads outside of the city. The object is to furnish a lake terminus for those roads, with abundant facilities for delivering coal and transferring it to vessels. Ground for a terminus and wharves at Charlotte have already been secured.

**Seaboard & Raleigh.**—Surveys have been completed for this road from Tarboro, N. C., to Williamston and Jamesville, and meetings are being held along the line to secure subscriptions to the stock, payable in money, ties or labor.

**Snow Storm.**—The heaviest storm of the winter began on the morning of Feb. 24, and the snow continued all day, with a high wind, which caused it to drift badly. The storm extended all over New England and the Middle states, reaching as far south as Norfolk, but not extending much west of Pittsburgh. Over all the region which it covered the railroads had much trouble from drifts, and almost everywhere trains were blocked and delayed, and some accidents resulted. It was felt with greatest severity on Long Island, where all travel was stopped for nearly three days, and the centre of the storm appeared to be on a line running thence nearly due west across New Jersey and through the Lehigh Valley in Pennsylvania. In Central and Northern New York it was less severe, and the roads there were not badly blocked, although there were many delays. The New England roads generally had much trouble to get clear.

**Southern Central.**—This company made default on the interest due Feb. 1 on its \$1,500,000 first-mortgage bonds. Interest has been paid on the guaranteed part of \$600,000 second-mortgage bonds, \$400,000 of which are guaranteed by the Lehigh Valley Company. The reason given for the default is that the earnings have been insufficient to pay, and the company has now a large floating debt.

It is proposed to fund all the existing funded and floating debt in new mortgage bonds, to bear only 5 per cent. interest. The plan is to make the new mortgage for \$3,000,000, to exchange the new bonds for the present firsts and guaranteed seconds at par and for the unguaranteed seconds and some funded coupons outstanding at a reduction to be agreed on; the floating debt also to be paid off by the new bonds. A balance will be left which will be used to put the road in good condition. It is said that a number of large holders have agreed to this plan.

**Southern Pacific.**—Contracts are to be let at once for the branch, which is to be built from Mohave, Cal., to the Colorado River to meet the Atlantic & Pacific road under the new arrangements, which, it is expected, will be made to stop the construction of that road at the Colorado.

**Texas & St. Louis.**—Work is being pushed on the extension of this road from Waco, Tex., toward Laredo, and 85 miles are now graded from Waco. Work is also being pushed on the Arkansas Division, and over 100 miles are graded, with tracklaying in progress. The engineers are now locating the road from Pine Bluff northeastward.

**Tucson & Gulf of California.**—This company has been organized to build a railroad from Tucson, Ariz., west by south to a point on the Gulf of California. Part of the road will be in Mexico.

**Union Pacific.**—A suit has been begun by Jay Gould and Russell Sage as trustees under the Kansas Pacific consolidated mortgage to require the trustee under the first and second land-grant mortgages to cancel those mortgages, all the bonds having been retired except \$17,500 firsts and \$1,000 seconds. They ask that the trustees be required to take such action, upon the deposit being made in Court of an amount sufficient to satisfy these remaining claims.

**Virginia Railroad Projects.**—Additional bills have been introduced in the Virginia Legislature to charter railroad companies as follows:

**Culpeper & Potomac.** to build from Culpeper Court House to Fredericksburg & Aquia Creek, or to a junction with the Potomac, Fredericksburg & Piedmont road.

**Norfolk & Danville.** to build from Norfolk to Danville on a line generally parallel to the southern border of the state.

**Washington & Ohio.**—The purchase of this road at foreclosure sale for account of the Baltimore, Cincinnati & Western Company has fallen through. The Treasurer of that company gave the commissioners of sale a check for \$50,000 as required by the terms of sale, but the check was returned protested from the New York bank on which it was drawn. The commissioners have therefore notified the Treasurer of the purchasing company that they will file a report stating the failure to comply with the terms of sale, and will ask for an order of resale and a judgment for the costs of the former sale.

**Western North Carolina.**—The Raleigh News and Observer says: "We learn that the managers of the Western North Carolina Railroad have ordered for it two new engines, 120 box cars, 40 flats, and 40 gondola cars, and two complete passenger trains, so as to equip the road in first-class style in respect to rolling stock. New trails, fish-bar, are being laid on parts of the line near Statesville, while 150,000 cross ties will be laid between Salisbury and Henry as soon as the weather permits."

**Wisconsin Central.**—The trustees operating this road have given notice to the officers of the Milwaukee & Northern Company that they desire to avail themselves of their right to annul the lease of the latter's road, and requested them to be prepared to take their property in six months. The reason for this is that the terms of the lease are not satisfactory.

#### ANNUAL REPORTS.

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## New York, Lake Erie &amp; Western.

The full report of this company for the year ending Sept. 30, 1881, of which a brief summary was issued two months ago, has been published, and the following is a summary of its statements.

The total length of the road, with its branches and leased lines, at the close of the year was 1,020,372 miles, an increase during the year of 10,472 miles. There are 30 miles of new road under construction.

A condensed statement of the general balance sheet is as follows:

Common stock.....	\$76,943,100.00
Preferred stock.....	7,632,200.00
Funded debt.....	67,165,065.95
Loans and bills payable.....	358,500.00
Interest due and accrued.....	1,109,530.70
Rentals.....	360,581.40
Current accounts and balances.....	3,028,816.48
Assessments on stock.....	2,907,814.00
Interest, exchange, etc.....	376,197.35
Profit and loss.....	5,798,556.26

Total.....	\$165,680,962.14
Estate of Erie Ry. Co.....	\$151,210,930.65
Additions to property.....	3,713,005.96
Special fund improvements.....	3,197,282.18
Leased lines, elevators, etc.....	706,779.34
Paid on account of equipment.....	1,607,851.88
Stocks and bonds.....	1,008,310.09
Materials and supplies.....	1,206,181.13
Discount on common stock.....	209,675.00
Bills and accounts receivable.....	2,600,082.19
Cash.....	100,863.74

There was an increase during the year of \$1,063,800 in common stock and of \$264,500 in preferred stock outstanding, and a decrease of \$8,078.90 in funded debt. The balance sheet shows an increase of \$3,130,851 in assets during the year.

The bonded debt and interest charges are as follows:

	Amount.	Rate.
First mortgage.....	\$71,000.00	7 3/4
Second mortgage.....	2,411,000.00	7
Third mortgage.....	2,150,000.00	7
Fourth mortgage.....	4,852,000.00	7
Fifth mortgage.....	2,926,000.00	7
Buffalo Branch.....	709,500.00	7
Buffalo Branch.....	182,600.00	7
First consolidated funded coupon.....	16,656,000.00	7
First consolidated funded coupon.....	3,702,157.20	7
New second consolidated.....	24,400,000.00	6
Second consolidated funded coupon.....	8,597,400.00	5
Income bonds.....	508,008.75	5
Total.....	\$67,165,065.95	

The yearly interest charge, excluding the income bonds, is \$4,148,745.50. From June 1, 1883, the second consolidated funded-coupon bonds will bear 6 per cent., which will increase the interest charge to \$4,234,719.50. The income bonds receive such rate, not exceeding 6 per cent., as may be decided by the board to be warranted by the net earnings.

The articles of incorporation provided that Erie shares failing to pay the assessment required by the reorganization scheme should be forfeited, and that the company should issue and sell for its own benefit an equal number of shares. Under this authority the company sold 5,000 shares of common stock during the year, and at its close had on hand 4,162 shares of common and 3,801 of preferred stock. The stock sold during the year realized \$230,925, or \$46.06 1/2 per share.

The traffic for the year was as follows:

	1880-81.	1879-80.	Increase.	P. c.
Passengers carried.....	6,144,158	5,491,431	652,727	11.9
Passenger miles.....	200,483,790	180,460,204	20,023,586	11.1
Tons merchandise.....	5,567,973	4,648,318	919,655	19.8
Tons coal.....	5,518,850	4,067,574	1,451,276	35.6
Total.....	11,086,823	8,715,892	2,370,931	27.2
Mer. ton miles.....	1,409,861,618	1,288,782,256	121,079,362	9.4
Coal ton miles.....	574,533,237	432,329,839	142,203,398	32.9
Total.....	1,984,394,855	1,721,112,095	263,282,760	15.3

Av train load:  
Pass., No..... 58 55 3 5.5  
Freight, tons..... 218 210 8 3.8

The average passenger journey was 33 miles, the same as in the previous year; the average freight haul was 179 miles, a decrease of 18 miles, or 9.1 per cent.

The coal and other supplies transported for the company's use amounted last year to 827,812 tons, increasing the aggregate tonnage moved to 11,914,635 tons.

The train mileage required to transport this traffic was as follows:

	1880-81.	1879-80.	Increase.	P. c.
Passenger.....	3,476,620	3,280,456	196,173	6.0
Freight.....	9,112,086	8,171,901	940,185	11.5
Switching.....	2,964,334	2,526,836	437,498	17.3
Other.....	332,233	314,683	17,550	5.6
Total.....	15,905,282	14,293,876	1,611,406	11.3

The earnings and net earnings per train mile and per unit of traffic were as follows:

	1880-81.	1879-80.	Inc. or Dec.	P. c.
Per freight train mile.....	\$1.75	\$1.76	D. \$0.01	0.6
Net.....	0.60	0.64	D. 0.04	6.3
Per pass. train mile.....	1.32	1.28	I. 0.04	3.1
Net.....	0.53	0.53		
Per pass. per mile.....	2.016 cts.	2.041 cts.	D. 0.025 cts.	1.2
Net.....	0.644 "	0.680 "	D. 0.036 "	5.3
Per ton per mile, freight.....	0.789 "	0.880 "	D. 0.090 "	9.2
Per ton per mile, coal.....	0.845 "	0.738 "	I. 0.107 "	14.5
Per ton per mile, all.....	0.865 "	0.836 "	D. 0.029 "	3.7
Net.....	0.276 "	0.302 "	D. 0.026 "	8.6

We have already commented (Page 683; Number for Dec. 2, 1881) at some length on the changes in the traffic of the road of late years, and on the great reduction in the cost of moving freight resulting from the extensive improvements made on the road in the past two or three years. Comparing last year with 1874-75, the average rate per ton per mile has decreased from 1.209 cents to 0.805 cent, or 33.4 per cent.; at the same time the expenses per ton per mile have been reduced from 0.958 cent to 0.529 cent, or 44.8 per cent., so that with the reduced average rate there was an actual increase in the net earnings per ton per mile from 0.251 cent to 0.276 cent, or 10 per cent.

In the same time the average rate per passenger per mile decreased 9.5 per cent., while the expenses were reduced 29.6 per cent., showing an increase in the net earnings per passenger mile from 0.277 cent to 0.644 cent, a gain of 0.367 cent, or 132.5 per cent.

The earnings for the year were as follows:

	1880-81.	1879-80.	Inc. or Dec.	P. c.
Earnings.....	\$11,126,149.24	\$11,199,498.37	D. \$73,349.13	0.6
General.....	4,853,427.37	3,191,616.96	I. 1,661,810.41	52.1
Freight.....	384,346.42	338,867.15	I. 45,479.27	13.4
Coal.....	4,041,267.03	3,682,951.18	I. 358,315.85	9.7
Express.....	167,450.50	163,771.38	I. 3,688.12	2.2
Passenger.....	44,464.66	27,370.60	I. 17,094.06	62.4
Miscellaneous.....	85,792.05	89,033.82	D. 3,241.77	3.6
Car service, freight.....	12,698.85		I. 12,698.85	
Total.....	\$20,715,605.18	\$18,603,108.86	I. \$2,022,496.32	10.8

	1880-81.	1879-80.	Inc. or Dec.	P. c.
Expenses.....	\$12,256,250.06	\$11,643,925.35	I. \$1,612,324.71	13.8
Transportation.....	5,851,335.11	5,109,979.90	I. 741,355.21	14.5
Motive power.....	3,782,861.42	3,291,141.43	I. 491,719.99	14.9
Maintenance of cars.....	1,056,805.15	861,135.29	I. 195,669.86	22.7
Maintenance of way.....	2,098,905.46	1,938,715.41	I. 160,190.05	8.3
General expenses.....	466,322.92	442,933.32	I. 23,389.60	5.3
Net earnings.....	\$7,459,375.12	\$7,049,183.51	I. \$410,191.61	5.8

The company has other sources of income, chief among which are the Pavia Ferry (Jersey City to New York), baggage express, elevator at Buffalo, docks, etc., the Grand Opera House in New York and other outlying properties, the income and expenses of which are included below under the miscellaneous heading.

The profit and loss account shows net losses and gains as follows:

	1880-81.	1879-80.	Inc. or Dec.	P. c.
Net losses.....	\$11,110.84			
Pavia Ferry Railroad.....	434.07			
Grand Opera House.....	1,471.88			
Unclaimed Baggage and Freight Department.....	13,518.82			
Brooklyn Annex.....	24,233.35			
Blake's Docks (Buffalo).....	\$50,778.86			
Net profits.....	\$17,836.12			
Pavia Ferry.....	744.51			
Baggage Express.....	39,983.19			
Weehawken Docks.....	37,931.14			
Buffalo Elevator.....	\$96,494.96			

The condensed statement of the account is as follows:

	1880-81.	1879-80.	Inc. or Dec.	P. c.
Net earnings.....	\$7,459,375.12			
Miscellaneous income.....	\$44,305.96			
Total.....	\$8,303,681.08			
Miscellaneous expenses.....	\$502,041.38			
Interest on funded debt.....	4,148,745.50			
Guaranteed interest, etc.....	451,667.38			
Interest on equipment.....	296,064.65			
Rentals.....	712,002.17			
Taxes.....	138,648.82			
Sundry accounts.....	10,779.28			
Old claims.....	96,314.16			
Total.....	\$6,416,283.34			

Net balance.....\$1,887,417.74

President Jewett's report, after stating this net balance, says:

"This amount, together with \$109,988.25, received from the Trustees during the year, from the assessment paid on the stock of the Erie Railway Company; \$230,325 received from the sale of 5,000 shares of our common stock; \$363,375 received in settlement with the London Banking Association; \$72,393.97 received in settlement with Bischoffsheim & Goldschmidt; \$332,500 realized from sale of \$350,000 Northern Central Railway Company's second-mortgage bonds; \$75,000 realized from the sale of stock of the Union Dry Dock Company, at par, and \$10,000 from the sale of Lockport & Buffalo Railway's bonds, at par, making in all \$3,080,999.96, have been applied mainly to improvements of the road and property, and to the acquisition of equipment and real estate, as appears in detail in the reports of the Vice-President and Auditor.

"The earnings and expenses of the year, compared with those of 1880, show an increase in gross earnings of \$2,022,496.32, an increase in operating expenses of \$1,612,304.71, and an increase in net earnings of \$410,191.61."

Referring to the gain in coal traffic, Mr. Jewett says: "This result cannot but be gratifying to the proprietors. It is practical evidence of the value of the great natural advantages which this company enjoys by reason of its close proximity to this source of traffic. The business is not only increasing largely in volume, but it has changed in character, so that we now carry it to Western points, thereby furnishing employment for a large number of our cars, which we were formerly obliged to send empty in that direction."

"The ratio of expenses to earnings was 64 per cent., being a decrease from 1879 of 6 per cent., and an increase over 1880 of 2 per cent."

"The increase in the cost of operating the road for the past year is accounted for by the large increase in our freight and passenger traffic, at reduced rates, and the increased cost of labor and material. Had we received the rates of 1880 for merchandise traffic, we would have earned an additional sum thereon of \$1,125,548.22, at a total percentage of cost of operation of the road of 60.7 per cent."

"Special mention is made of the car-service account for the reason that for the first time in the history of the company it shows a balance to the credit amounting to \$12,698.85. This is one of the incidental advantages of the change of gauge, the owning of our own equipment, and our ability to exchange cars with all roads."

"The funded debt has been decreased during the year \$8,078.90, as follows: There has been purchased and canceled \$11,000 of fourth-mortgage bonds, and the holders of \$13,000 of first-consolidated mortgage bonds having assented to the plan of reorganization, as they were entitled to do, involved the issue for the coupons thereof, of first-consolidated funded-coupon bonds to the amount of \$2,921.10, thus increasing such coupon bonds to \$3,702,157.20. The total amount, therefore, of the funded debt, Sept. 30, 1881, is \$67,165,065.95. The amount of first-consolidated mortgage bonds at present unassented is \$180,000."

"Much progress has been made in carrying into effect the programme marked out on the organization of this company, for the improvement of its road and property, to the end that it might be more efficiently, economically and successfully operated. The results of the past year, when compared with those of preceding years, justify, beyond all question, the policy adopted, and the steps taken in the direction of making such improvements, and, although much has been done, there yet remains a great deal to do. The success of the company depends upon its ability to perform its service with the greatest degree of economy and efficiency."

"The tendency of the times is to a remarkably low rate for transportation service. To be able to perform the service required, every facility for the economical working of the road must be provided."

"The effort of the managers of this company has been to put the property in condition to meet the state of affairs which they, to some extent, anticipated, and which is now fully upon us; and although the competition for traffic has reduced rates to a point below that which was supposed to be at all remunerative, this company has, through its increased facilities and its ability to work with the highest degree of economy, been able to produce results which must be highly gratifying to its proprietors; and the managers of the company have no reason to doubt that if the policy heretofore adopted is diligently adhered to, and the improvements inaugurated and in contemplation are carried out to their completion, the net revenues of the company will continue to improve, until they will be sufficient to meet all the requirements necessary to the absolute security of its creditors, and reach a point of being remunerative to its proprietors."

"The board is gratified to say that the various officers, agents and employees of the company have performed the duties required of them with promptness and efficiency."

The report of Vice-President Robert Harris recounts the improvements of the road and equipment during the year, which were substantially as follows:

The completion of the Bergen County Cut-off, 10 miles of double-track road, from Rutherford to Ridgewood, giving a line with easy grade for freight trains which avoid the many level crossings in the city of Paterson and the draw-bridge over the Passaic. "The saving of expenses of the present freight business alone, from the reduced grades and distance, is a generous return on the investment," which was \$481,500, or \$48,150 per mile of double track.

A spur track to the mills at Passaic was begun. The second track and loops on the Buffalo Division were completed, except two miles. Sidings and third tracks amounting to 45 1/2 miles were laid (7 miles of them on the leased Buffalo & Southwestern). The yard at East Buffalo was remodeled and enlarged, so as to avoid confusion and permit the growth of business. (Cost, \$213,760.) The freight yard and harbor front in Buffalo was enlarged, so as to add greatly to the facilities for transferring the immense lake business in coal, ore, lumber, etc., there, and 1.6 miles of second track was completed and much grading for 4 1/2 miles more was done near the Buffalo terminus. The 6-ft. gauge track left on branches was all narrowed to standard gauge except the 3 1/2 miles from Lackawaxen to Hawley, where there are three rails, the 18 miles from Suffern to Piermont, and the 2 1/2 miles from Bergen to Nyack, which were of 6-ft. gauge only. The outer rail forming the 6-ft. track was removed on the line from Bergen to Paterson by way of Newark, and between Hornellsville and Buffalo.

The whole length of road worked at the close of the year was 1,020 1/2 miles, of which 428 1/2 miles were double-track road.

The stock of locomotives amounted to 400 broad-gauge and 139 standard-gauge engines at the beginning of the year. During the year 14 were torn down against 4 constructed at the company's shops; but 15 were leased of Car Trust No. 2 on a contract to purchase, and the stock consisted of 326 broad-gauge and 218 standard at the close of the year.

The stock of cars at the end of the last two years has been:

	1881.			1880.		
	Standard.	6 ft.	Total.	Standard.	6 ft.	Total.
Passenger train:						
First class.....	196	29	225	145	90	235
Second class and emigrant.....	69	9	78	34	40	74
Baggage, mail and express.....	101	1	102	77	20	97
Total.....	366	39	405	256	150	406
Freight:						
Milk.....	38	3	41	8	35	43
Box.....	11,698	500	12,198	10,773	1,042	11,815
Stock.....	1,098	118	1,216	1,123	28	1,151
Oil tank.....	250	2	252	131	140	271
Flat.....	659	56	715	404	277	681
Gondola.....	1,825	103	1,928	1,735	355	2,090
Gondola dump.....	3,762		3,762	1,120		1,120
Coal, 8-wheel.....	2,227	2	2,229	174	2,131	2,305
Coal, 4-wheel.....	150	1,510	1,660	150	1,946	2,096
Total.....	21,680	1,994	23,674	15,618	5,954	21,572
Equivalent to 8-wheel cars.....	21,611	1,389	23,000	15,543	4,981	20,524
Service Cars:						
Inspection.....	3		3	2	1	3
Pay.....	2		2	2		2
Caboose, 8-wheel.....	50	1	51	11	44	55
4-wheel.....	115	62	177	48	131	179
Gravel.....	50		50		43	43
Derrick and tool.....	21	10	31	12	18	30
Total.....	241	73	314	75	237	312

The passenger stock has been nearly all reduced to the standard gauge. The other changes in the year are a reduction of 10 in the number of first-class cars, and an increase of 4 in the number of second-class and emigrant and of 5 in the number of baggage, mail and express cars.

In freight cars the number of 6 ft. gauge has been reduced by 3,960, and the number of standard gauge increased by 6,068—a net increase of 2,108. The increase is chiefly in "gondola dump" cars, of which 2,642 have been added. There is an increase of 353 in box and of 65 in stock cars, but a decrease in other kinds and a large one in 4-wheel coal cars. Gondola dumps are apparently taking the place of coal cars.

A very large proportion of the stock of freight cars and 45 of the locomotives are leased of car trusts on a contract to purchase, paying in installments. During the year \$886,196 was paid on account of the principal of these car trusts, and there remained due \$4,732,963, of which about \$935,000 falls due within the current year.

The expenditures of capital during the year were:

Permanent way.....	\$836,491.80
Engine-houses and shops.....	145,635.82
Shop machinery.....	28,322.18
Stations and warehouses.....	125,375.07
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ering freight at the Hudson River terminus, "for the want of which the side-tracks are at times blocked with loaded freight cars as far west as Elmira." The company owns 2,500 ft. of water-front at Weehawken, which may be developed for this purpose; only 1,000 ft. of it is now improved. Plans for piers, with stock-yards, etc., have been made, estimated to cost \$1,094,800, and proposals have been invited for the construction of part of them, to be brought into use the coming spring. The improvement of the Harbors Cove property is also recommended, with warehouses.

The construction of 42 miles of second track, in five sections, is recommended, at a cost of \$700,000. In one place the second tracks would permit the use of pushers on steep grades, and the addition of one-third to the number of cars in freight trains on the division.

The Vice-President says finally: "Whilst the improvements now in progress, together with those herein recommended, will place the road in condition to compete favorably with the other trunk roads, still further expenditures will be needed to meet the growing demands of the traffic and to establish the permanent prosperity of the road."

#### Illinois Central.

The following report of the directors for the year ending Dec. 31 is published in advance of the annual report, which is not yet completed:

The gross traffic of the line for the past year was \$5,586,397.44, against \$8,304,811.81 for the year 1880. The tonnage carried shows an increase of 5.72 per cent. over that of the previous year, while the gross earnings show an increase of 3.04 per cent.

The net result is \$3,227,181.74, and is \$251,830.87 less than that of 1880. The net receipts from all sources were as follows:

From traffic.....	\$3,227,181.74
" land.....	123,032.26
" interest on bonds.....	161,105.00
" premium on C., St. L. & N. O. R. R. bonds sold.....	150,000.00
Total.....	\$3,662,219.00

The interest on the debt and two dividends on share capital were paid, besides \$925,380.36 for extraordinary expenses in Illinois. The latter include an elevator at Cairo of 600,000 bushels capacity; 103 miles of track laid with steel rails; the completion of three iron bridges, with stone piers; the completion of two new docks in Chicago, each 300 ft. wide by 1,000 ft. long, and an iron viaduct across all our tracks; also important additions to the equipment.

At the close of 1886, the company was charged with \$95,559,780 of funded debt and stock. It then owned 706 miles of railway, 150 engines and 3,629 cars. It is now charged with \$38,750,000, and owns 930 miles of railway in Illinois (besides 195 miles of sidings and double track), 224 engines, and 6,172 cars. From the present debt of \$9,750,000 may be deducted bonds of the Chicago, St. Louis & New Orleans Railroad, for \$3,632,000, which, at par, will reduce the debt and share capital to \$35,118,000—half a million less than it was in 1886.

The company owns \$6,670,000 of the Southern Line stock, and \$983,000 of stock in the Middle Division, making \$7,653,000. Deducting the current value of these, the charge upon the company's property might be regarded as reduced to the share capital of \$29,000,000.

From 1866 to 1881, inclusive, \$7,667,819.84 have been spent in betterments (\$2,153,720.07 of which was expended in 1870 to 1881, inclusive). This includes steel rails, stone ballast, iron bridges, cars and equipment. This sum, with \$1,600,000 paid for the Springfield Division, and \$883,000 for the Middle Division, makes \$10,150,819.84 added to the property in 15 years, during which time the debt has been diminished.

The economy in operation is to a great extent the source of the very satisfactory results obtained during the last five years.

The three items in operation expenses which show the advantages of working a well fitted railway are maintenance of way, maintenance of equipment and claims and damages. These three items from 1866 to 1870 aggregated \$12,575,554.04; the same items from 1876 to 1880 aggregated \$6,924,988.28, showing a saving in the last five years of \$1,130,119.15 per annum, or a total of \$5,650,565.78. By this economy the net profits have in the last five years increased about 40 per cent. This result could not have been obtained except by the expenditures made to put the property in a first-class physical condition, so as to transport a large volume of business at low rates.

For the first five years mentioned there was operated an average of 937 miles of railway; for the last five years an average of 1,215 miles. Maintenance of equipment during the last five years covered the addition of more than 40 per cent. to the number of cars and engines; while the tons of freight carried over the line had grown from 1,633,944 tons maximum in the first five years to 2,703,582 tons maximum in the last five years.

The three maximum years, 1869 to 1871, aggregated \$13,950,682.14 in gross receipts from freight in Illinois. From 1871 the shrinkage was very marked. The gross receipts from freight, on the Illinois Central proper, were gradually reduced from \$4,305,616.95, in 1872, to \$3,032,336.91, in 1877—a loss of one-third. This loss, in the face of increasing tonnage, was due to diminished rates. In 1877 the earnings from all sources fell to \$6,659,845.40. This was the turning point of the Illinois Central Railroad Company. The net earnings in 1876 and 1877 averaged \$2,345,000 per annum. For the last two years, 1880 and 1881, the average has been \$3,353,000 per annum net, the largest average for any two consecutive years in the company's history.

The improvements to the line have told with great effect since 1878. The maximum expense for maintenance of equipment was in 1869 \$1,246,478.21. The minimum in 1879 was \$490,923.28. The maximum expense for maintenance of way (937 miles) was \$1,314,028.86. This was reduced in 1879 (1,215 miles) to \$640,575.53. This reduction demonstrates that the most remunerative employment of capital in a railway is in perfecting its condition.

In February, 1872, the question of extending our operations to New Orleans was fully considered. It was decided to adopt the policy of extension. On obtaining final possession of the Chicago, St. Louis & New Orleans Railroad, in 1878, a definite policy of improvement was adopted—laying it with steel rails, putting in iron bridges, ballast, etc., in order to reduce expenses. This road has been virtually rebuilt from Cairo to New Orleans, and the two lines of which it was composed have been consolidated under one management. On Aug. 1 last, the line was changed to the standard gauge of 4 ft. 8½ in., making it uniform with that of the Illinois Central. Since then cars have been transferred without detention and at greatly decreased cost.

During the past year borings have been made in the bed of the Ohio River, opposite Cairo, with a view of determining the location of a bridge at that point, and plans will be shortly prepared.

The wheat crop of Southern Illinois was very short, and the average yield of corn in the state 30 per cent. less than that of 1880. The Illinois Central, which in former years

was almost entirely dependent upon a grain traffic, finds now use for its cars in moving other commodities, and this will increase in direct ratio to the gain in wealth and population, and in the development of manufactures in the state.

The state of Iowa, following the example of Wisconsin and Minnesota, has, through her Board of Railroad Commissioners, recognized her own interest by dealing more reasonably with the railways. The arbitrary schedule of rates imposed by the state of Illinois, without reference to circumstances, and admitting of no variation, is creating great dissatisfaction already among the shippers throughout the state, who are thus at a disadvantage in competing with their rivals in the large cities of the adjoining states.

During 1881 there were sold 24,244.68 acres of the company's lands for \$135,587.57, an average of \$5.59 per acre. The company now has 226,852.59 acres remaining unsold.

On Oct. 1, 1881, the directors sold \$2,500,000 of the Chicago, St. Louis & New Orleans Railroad bonds which this company held, and called in the same amount of our redemption bonds due in 1890.

#### Portland & Ogdensburg.

This company owns a line from Portland, Me., to Fabyan, N. H., 91 miles, and from Scott's Mills, N. H., to Lunenburg, Vt., 8 miles, making 99 miles in all. The two sections are connected by 20 miles of the Boston, Concord & Montreal road, from Scott's Mills to Fabyan, the use of which is leased at a rental of \$6,000 per year.

The equipment consists of 9 locomotives; 18 passenger and baggage cars; 110 box, 152 flat and 5 caboose cars; 1 crane car and 3 snow plows. Additions last year were 1 locomotive, 24 freight cars and 1 crane car.

The general account is as follows:

Stock.....	\$1,032,185.55
Bonds.....	3,088,000.00
Bills, accounts and balances.....	141,557.83
Profit and loss.....	89,018.39
Total.....	\$4,360,761.77
Road and equipment.....	\$4,219,591.00
Materials.....	14,068.75
Bills, accounts and balances.....	91,424.54
Cash.....	35,737.48
Total.....	4,360,761.77

The bonded debt consists of \$800,000 bonds of Nov. 1, 1870, which were all sold, and \$2,268,000 bonds of Nov. 1, 1871, of which \$918,000 were sold and \$1,350,000 exchanged for an equal amount of Portland city bonds.

The earnings for the year were as follows:

	1880-81.	1879-80.	Inc. or Dec. P. c.
Passengers.....	\$126,457.80	\$109,153.56	I. 17,304.24 15.8
Freight.....	163,223.35	170,008.89	D. 6,785.54 3.9
Mails, etc.....	14,564.18	13,486.93	I. 1,067.25 7.8
Total.....	\$304,245.33	\$292,650.38	I. \$11,585.95 4.0
Expenses.....	213,168.21	189,964.11	I. 23,204.10 12.2
Net earnings.....	\$91,077.12	\$102,686.27	D. \$11,618.15 11.3
Gross earn. per mile.....	3,236.65	3,113.40	I. 123.25 4.0
Net.....	968.91	1,092.50	D. 123.59 11.3
Per cent. of expenses.....	70.06	64.90	I. 5.16 ....

Expenses were increased by increased renewals and improvements. Passenger business increased; local freight increased, but there was a loss in through freights. Arrangements have recently been made with connecting lines through which a large increase in through freight is expected.

The disposition of net earnings was as follows:

Net earnings, as above.....	\$91,077.12
Interest paid.....	\$70,203.32
Paid on Dalton construction loan.....	2,552.09
Payments on equipment.....	9,340.00
Total.....	\$2,005.41

Balance, increase of cash on hand..... \$8,981.71

The interest paid included \$3,483.32 general interest, \$48,000 on bonds of Nov. 1, 1870, and \$18,720 on the coupons funded from those bonds. The company paid no interest on its other bonds.

The traffic for the year was as follows:

	1880-81.	1879-80.	Inc. or Dec. P. c.
Train miles.....	132,240	140,381	D. 8,141 5.8
Passenger.....	61,539	71,174	D. 9,635 13.6
Freight.....	49,762	33,975	I. 13,387 40.5
Service and switching.....	20,541	34,930	D. 4,389 1.8
Total.....	207,211	249,005	I. 13,206 14.0
Passengers carried.....	3,761,952	3,314,655	I. 447,297 13.2
Tons freight carried.....	158,196	161,300	D. 3,104 1.9
Ton miles.....	5,155,830	4,883,618	I. 272,212 5.6
Av. train load:			
Passengers, No.....	23.61	4.84	20.5
Freight, tons.....	82.78	68.59	I. 15.19 22.1

Of the passenger miles 48.3 per cent., and of the ton miles 64.4 per cent., was of local business.

Extensive improvements have been made in the road by filling in pile bridges, widening cuts and reducing grades on the Portland end of the line, enabling engines to move heavier freight trains. About one mile of new sidings was built. In the White Mountains section work has progressed on the improvement of the line by widening cuts and filling trestles. The retaining wall at the Dismal Pool has been completed and the line there is to be changed to avoid a sharp reversed curve.

Four miles of steel rails, 1½ miles of re-rolled iron rails and 12,000 new ties have been put in the track. The bridges and buildings have been generally kept in good repair and painted where necessary.

#### New York, Ontario & Western.

This company is successor through foreclosure to the New York & Oswego Midland, and owns a main line from Middletown, N. Y., to Oswego, 249.6 miles, with branches from Summitville to Ellenville, 8 miles; Walton to Delhi, 16.7 miles; East Guilford to New Berlin, 23.3 miles, and from Norwich to Cortland, 48 miles, making 344.6 miles in all. There are 46 miles of sidings. Of the main lines 31 miles are laid with steel. The report is for the year ending Sept. 30.

The equipment consists of 73 engines; 32 passenger, 8 emigrant and 20 baggage, mail and express cars; 429 box, 9 milk, 37 stock, 576 flat and 411 coal cars; 17 service cars.

The general account is as follows:

Stock, preferred.....	\$2,000,000.00
Stock, common.....	58,113,982.84
Total stock.....	\$60,113,982.84
Pay-rolls, accounts and balances.....	330,438.09
Profit and loss.....	230,853.07
Total.....	\$60,705,274.00
Cost of road and equipment.....	\$51,506,155.19
Cost of other lines owned.....	4,865,916.47
Accounts and balances.....	216,354.31
Materials.....	627,698.03
Cash and demand loans.....	3,591,150.00
Total.....	60,705,274.00

There was an increase of \$1,294,826.61 in the common stock, due to the settlement of additional claims under the agreement and plan of reorganization. There was an increase in cost of other lines owned of \$2,865,916.47, which

represents the expenditure for the construction of the line between Middletown and Weehawken, and for the purchase of the additional terminal property at Weehawken and improvement of the same during the year.

The traffic for the year was as follows:

	1880-81.	1879-80.	Increase. P. c.
Train miles.....	211,242	.....	.....
Passenger.....	304,598	.....	.....
Mixed.....	144,553	.....	.....
Freight.....	127,935	.....	.....
Service and switching.....	788,328	.....	.....
Total.....	788,328	.....	.....
Passengers carried.....	326,670	273,778	52,892 19.3
Passenger miles.....	7,251,209	6,346,667	904,542 14.3
Tons freight carried.....	348,513	255,410	93,103 36.5
Ton miles.....	19,511,452	13,974,253	5,537,199 39.6

The increase in traffic was entirely in local business, as the road is not yet prepared to do through business.

The earnings for the year were as follows:

	1880-81.	1879-80.	Increase. P. c.
Passengers.....	\$180,151.73	\$151,392.00	\$28,759.73 19.1
Freight.....	469,155.78	377,326.00	91,829.78 24.1
Mail, etc.....	275,737.06	53,994.00	221,743.06 410.6
Total.....	\$925,044.57	\$583,212.00	\$341,832.57 58.6
Expenses.....	707,500.73	565,704.32	141,796.41 25.1
Net earnings.....	\$217,543.84	\$17,507.68	\$200,036.16
Gross earn. per mile.....	2,684.45	1,092.45	1,592.00 58.6
Net.....	631.29	50.80	580.49
Per cent. of exps.....	76.48	67.00	.....

No statement is given of the sources whence the extraordinary amount of miscellaneous earnings was derived. The only payment from net earnings was \$114.08 for interest.

The earnings of the road are hardly expected to show much increase until the outlet to New York is finished. A contract has been made, beginning Jan. 1, 1882, and running for five years, for the transportation of coal to Oswego, which will largely increase the tonnage.

There were added to the capital account in cost of road, etc., the following amounts:

For new stock issued.....	\$1,294,826.61
Cash paid for improvements and new equipment.....	495,377.03
Total.....	\$1,790,203.64

Received for assessments on stock..... \$387,703.33

Sale of old equipment..... 60,062.39

447,855.72

Increase in cost..... \$1,242,347.92

Terminal facilities at Oswego were improved and access to the lake water-front secured.

President Winslow's report says:

"Appreciating the importance of ample and convenient terminal facilities, it was deemed best by your board to acquire additional property at Weehawken.

"As the result of negotiations with the adjacent land owners, the company controls about 7,000 ft. of frontage on the Hudson River and an area of 211 acres lying between the bluff and the river, with the improvements thereon. There are also 140 acres of land on the high ground, which, with the improvement of the terminus and the establishment of a good ferry, will become valuable for purposes of residence and business.

"The land purchased, when improved, will afford terminal accommodations for the company and its associated and connecting lines unsurpassed by those of any road terminating at New York.

"At the date of the last annual meeting the only contracts for construction which had been made were for the tunnels at West Point and Weehawken. In the spring of 1881 the entire line from Middletown to the Hudson River was placed under contract. Owing to unexpected difficulties in regard to rights of way, particularly along the Hudson River, the work was considerably delayed until late in the summer, and the progress made up to this date has been less than anticipated. The tunnels are now well advanced and the work at all points is being vigorously prosecuted. Track laying will be commenced at several points in the spring, and it is hoped the entire line will be opened for business during the summer.

"The directors having secured the control of the companies and charters in New York and New Jersey necessary to the construction of a connecting road between the main line at Middletown and Weehawken, together with terminal and ferry facilities, and having commenced the work of construction, entered into negotiations with the New York, West Shore & Buffalo Railway Company, which company was engaged in the construction of a railroad from Hoboken to Buffalo, via the west shore of the Hudson River, to join at Cornwall, and use in common the proposed road between that point and Weehawken (52 miles), thereby avoiding competition and securing to the road and terminus in addition to your own business the traffic of a great low grade trunk line to the West.

"The result of the negotiations was a decision on the part of the New York, West Shore & Buffalo Company to abandon the construction of its line south of Cornwall upon condition that the companies under the control of this company should consolidate with it, thus forming a continuous line from Weehawken to Buffalo.

"As the object to be secured to your company in the construction of the road from Weehawken to Middletown was the control of an independent outlet for the business of the main line, and it being evident that owing to the very great cost involved in the terminal property, tunnels and river line, it must require a large traffic in order to earn adequate returns on the investment, it was decided to be very important to prevent the building of a parallel line, in order to avoid all conflict of interests and to secure the business of the West Shore Company over the road south of Cornwall, provided the original designs of your company could be properly carried out and protected.

"Under the advice of counsel an agreement of consolidation was prepared, entered into for, and ratified by, the several companies, under which perpetual use of the road from Middletown to Weehawken is secured to the New York, Ontario & Western Railway Company for all its traffic, and for the construction of which road it will receive \$10,000,000 of first-mortgage bonds and \$2,000,000 of the capital stock of the consolidated company.

"A joint use of the double track railway between New York and Cornwall, including terminals and all conveniences, has been provided for under conditions which are just and fair to your company and to the New York, West Shore & Buffalo Company.

"Under this arrangement it is believed your company will receive all the benefits desired in respect to its traffic, while the investment in the securities of the consolidated company will be more certain to produce a revenue to this company than could be expected from those issued upon a line limited to local traffic and to the business contributed by the main line of your road only.

"The coming year will be an important one in the history of your property. Sufficient has been accomplished to warrant the belief that from the completion and use of the New York connection, and with the improvements in the road and equipment made and in progress, there will result an increase in traffic which should place the property upon a dividend-paying basis."